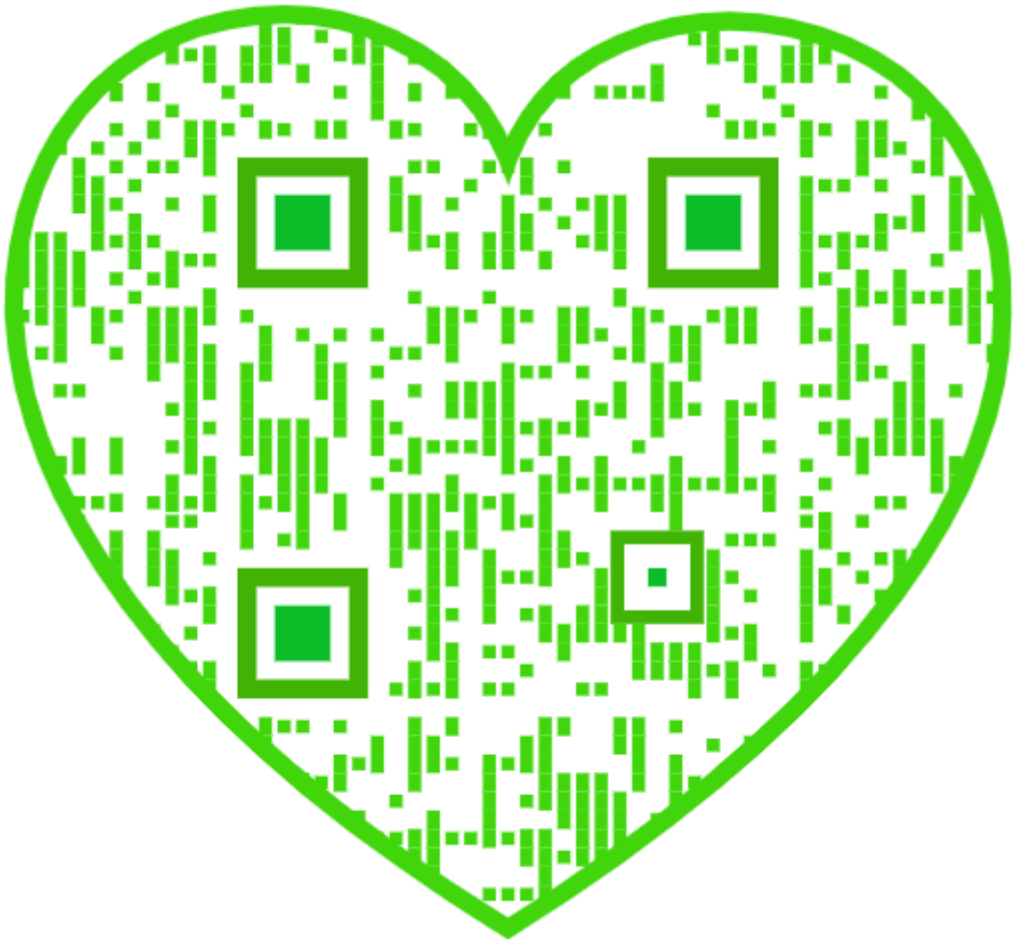
UC-NRLF
$B 77 831



LIBRARY
OF THE
UNIVERSITY OF CALIFORNIA.

Class

GENERAL INDEX

TO THE FOUR
VOLUMES OF

Ore Dressing

BY

ROBERT H. RICHARDS, S.B., LL.D.

Professor of Mining Engineering and Metallurgy at the Massachusetts Institute of Technology, Boston, Mass., U. S. A.

LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA

1909
McGRAW-HILL BOOK COMPANY
NEW YORK

TN500
R5
Index

GENERAL

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

INDEX.

A GENERAL GUIDE TO ALL FOUR VOLUMES.

Pages 1–643, Vol. I: 644–1197, Vol. II; 1199–1610, Vol. III; 1611–2052, Vol. IV.

A

Aachen, wash trommel at 331
Aaron, C. H., gold amalgamation 788
gravity stamps 226
leaching gold and silver xix
losses in gold milling 1180
on amalgamated plates 752
leaching 1167
testing gold ores by chlorination..... 1173
Abadie, E. R., gravity stamps 224
North Star gold stamp mill at Grass Valley, California 1175
on mortars 165
plates at the North Star mill 787
A Bartlett mill xxvii
Abbé Engineering Company. Abbé spiral feed 1323
tube mill 1280, 1298
at Guanajuato, capacity of..... 1291
sizing test of feed and discharge 1290
mills..... 1291, 1626, 1677
Abbott, J. W., running a stamp mill 229
Absorption of amalgam by plates 765
mercury by amalgamating plates 1514
Accelerated jig 507, 510, 515, 519, 610
details of stroke 638
mechanism, air pressure and gravity 537
cam and gravity in Stutz coal jig 537
cam and spring 537
disc motion 536
for jigs 533
hammer and spring on Collom jigs 536
motion Harz jigs at Mill 125 .....1701, 1702, 1703
on Wilfley table 673
Accessory apparatus 842, 1570
Accounting, mine 1923
Accounts and reports 1122
bibliography for 1173
Accuracy of machine sampling 1575
Acids, action of on mercury 730
for cleaning mercury 786
Acids used in settling tests 1147
on amalgamated plates 751
Acid water, cause of base bullion 783
effect of 906
in amalgamation 751
on amalgamated plates 750
jig tanks..... 523
plates 749
screens 173
neutralized 173
Acme concentrator. L. H. L. Huddart 2023
E. Walker 2023
guide for gravity stamps 154, 155
ore feeders at Mill 100 1624
table 1506
Across the San Juan Mountains. T. A. Rickard .. 1923
Action of air jig 822
belt tables 698
breakers compared 55
buddles 704
bumping belt tables 669
tables 682
centrifugal force 827
classifiers 387
crushing machines 300
Gates breaker 39
gravity stamps 144
jaw breakers 36
Action of jaw and spindle breakers 52
Rittinger table 668
rolls 62
steam stamps 113
trommels 373
vanners..... 644, 646, 656
Actions in crushing 8
Adair-Usher cyanide process on the Rand 1644
Adalbert Works, hand picking at 492
Adams, J. M., amalgamating pans 290, 291
amalgam at the Owyhee silver mill 787
dimension of Black Hill traps 773
end and side-shake vanners 655, 656
form of riffles in mercury traps 772
gravity stamps 223, 226, 230
impurities in amalgam 251
life of retorts 783
pointed boxes 477
slope of plates 746
splash plates 736
Adams, W. J., amalgamated plates 739, 746
amalgamation 787, 1173
amalgamation and gold mills xix
mercury traps 772
vanners 655, 656, 727
Adelaide mill 1794
Adhesion 839
in dry concentration 826
of minerals, effect of 4
separation by 831
Adjustment of Blake breakers 16, 22, 23
Card concentrator 1483
classifier 430
Comet breaker 43
Frue vanner for testing 1153
Gates breaker..... 39
gravity stamps 219
gyratory breakers 1218
Hooper air jig 822, 823
jigs 552, 598
machines 1115
Mechernich magnetic separators at Mill 135 ... 1736
throw on jigs 531, 594, 595
travel, slope, and water on vanners 660
spindle breakers..... 47
vanners 653, 663, 658, 659
Wilfley table head motion 1466
Advantages and disadvantages of various crushing machines 313
accelerated mechanism on jigs..... 535
accounts 1123
action of jaw breaker 55
action of spindle breaker 55
air *versus* water concentration 825
arrastra 238
Collom jig 514
concentration over smelting 1
electric power 1091
Elmore oil process 832
filter-pressing plants as against decantation plants 1646, 1647
flat mill site 1086
gravity stamps 222
hand breaking 12
hand jigs 892
hand picking.....480, 487
helicoid conveyor over older types 1582
high-speed rolls 88
large breakers 49

194228

Advantages of large motors 1092
machine feeding 1115
magnetic concentration 1053
mercury wells 771
Muntz metal plates 750
Parsons & Fisher jig 518
picking in the mine 481
pipe and plug jig spigot 527
removing dust before washing coal 817
riffle tables 679
rock breaker at mine 1109
rolls of large diameter 83
sectional mills 1108
separate treatment of mine fines 1111
side hill site for mills 1085
silver combination mills 1040
silver-plated amalgamated plates 748
skimming jigs 577
sliding block mechanism 535
A-frames for gravity stamps 157, 158
Africa, milling at the Simmer & Jack, G. O. Swart 2035
stamp mill practice in, F. C. Roberts 2044
Agassiz, A. viii
Aggregation affecting separation 889
of minerals, effect of 3
Agitation 892, 1611
after sizing or sorting 891
in kieves 726
ratio on vanners 665
use made of, in mills 890
Agitator for bottle tests 1157
Agitators for amalgamation 780
for clay 1076
Ahun Colliery, Carr disintegrator at 284
Aikinite, specific gravity of 1188
Air blast, continuous 816
dry blanket 825
panning 825
for emery 1079
graphite 1075
Hochstedt apparatus 816
on horizontal belt 818
bubbles affecting separation 890
effect of 4
on free settling 464
classifier at Engis 817
concentration, bibliography for 837
by 815
concentrators, classification of 816
using centrifugal force 818
continuous blast 816
gaps, ampere turns required for 795
hoists, Pilling 1608
jigs 640, 816, 820
Hooper-Paddock 820
Krom 824
pressure and gravity jig mechanism 537
separator, Clarkson-Stanfield 820, 828
Mumford & Moodie 818
Pape-Henneberg 818, 828
settling, use made of, in mills 889
suction used in asbestos dressing 817
versus water for concentration 825
Aitken, R. M., stamp mill construction 2048
Akens & Evans slimer, the 1500, 2022
Akins & Evans concentrator 2023
Akron Chili mill 1307
table of sizes, capacities, speeds, weights, etc. .. 1308
Aktien Company, new mill of 1924
Alabama graphite mills 1075
hematite, cost of concentrating 1135
ores roasted for magnetism 814
iron ore concentration 1176
magnetic concentration of 833, 835, 836
washing in 1180
Alaska, cost of producing gold in 1975, 1976, 1977
dredging in 1009
stamp mill practice at Douglas Island 2039
Treadwell Gold Mining Co. 1181
amalgam squeezer used by 781
mill 1127, 1133, 2037, 2042
costs and output at the 2048
descriptions of, R. A. Kinzie 2033
heavy stamps 220
H. Watson 2043
mortar blocks 148
Albany compound for greasing guides 156
grease 1098
Albertite, specific gravity of 1188
Albite, specific gravity of 1188
Alburtis, Pennsylvania, mill at 1055
Alden breaker 59, 61
Alexandria Coal Co., washing plant 1178
Alice mill 1134
Alignment of rolls 71
Alkali to prevent sickening of mercury 751
Allard coal washing methods 2018
Alleghany Iron Co. 809
Allegheny Ore and Iron Company, McLanahan and Stone single-roll crusher at 1241
Allen, Robert, West Australia metallurgical practice 1323
Allevard, calcining for friability 9
hand picking at 492
magnetic separation at 834
mill at 1178
picking at 487
roasting for friability at 58
magnetism at 814
sizes of ore hand picked at 487
Allis, E. P., Co., amalgamating pan ..243, 244, 245, 246, 247, 249
clean-up pan 251
edge runner mill 270
mechanical batea 683
on design of cams 197
stamp tappets 189
patent cams 194
stamp mortar 228
Allis, E. P., on shoe shanks 181
stamp bosses 187
stems 187
rolls 76, 111
at Mill 136 ..... 1737, 1738
speed 88
Allis-Chalmers Company, an improved trommel ... 1360
annular picking table 1435
Ayton thick-pulp extractor 1408
ball mills, regards work, cost, etc. 2016
Challenge feeder 1577
clean-up pans at Mill 100 1625
corrugated rolls 1242
costs of breaking ore 1222
Frue vanners at Mill 127 ..... 1711, 1712
Mill 170 1868
Gates ore breakers 1222
rock and ore breakers 1222
tube and ball mills 1323
mill 1296
Hancock jig 1440, 1459
improved Wolf-Tongue classifier 1387
Lamb automatic tailings sampler 1574, 1609
Richards' shallow-pocket hindered-settling classifier 1384
rolls 1137, 1244
at mills 1707, 1724, 1750, 1751, 1752, 1854, 1866, 1867, 1877, 1878, 1885, 1898, 1913
simple steam stamp at Mill 182 1909
single-cylinder steam stamp 1256
stamps at Mill 100 1624
steam stamp 2011
suspended frame vanner 1503
testing screens 1138
toothed rolls 1242
vanners at Mill 136 1739
Allis Corliss engine 994, 997, 1000
pump 994, 997, 1000, 1003
reliance rolls 82
steam stamp 114, 116, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128 131, 133, 142
valve motion 124
Allison Rand mine 2044
Allouez Copper mine, hand picking at 492
mill 1089, 1107, 1109, 1174
cost of stamping 142
steam stamps 120
Alma Emmons sludge mill ..... xxv, 902
Alpha DeLaval separator 827
Alsing Company, the J. R. driers 1597, 1609
tube mills 1323
cylinder 234, 266
bibliography of 294
tube mill 1280, 1294
table of sizes, power, etc. 1296
Altenberg classifier 416, 475, 478
mine, wash trommel at 331
Saxony, calcining ore for friability at 9
mill at 1086, 1173

Alternate polarity in magnetic separation 798
Alternating current in magnetic separation 835
Althans, E., Ball stamp 143
Blake, Marsden and Alden breakers 61
buddles, slime, and percussion tables 729
Dingey mill 293
German and California stamps 230
Krom jig 839
Krom's rolls and coal rolls 112
on breakers 61
ore dressing 1186
Phœnix and Sholl pneumatic stamps 143
Aluminum amalgam 730
atomic weight of 1188
bronze cloth screen 174
plate screens 174
specific gravity of 1188
Alum used in settling kaolin 1149
tests 1147
Amador City, California, mill at 1032, 1037
County, California, mills in 1180
cost of milling 1134
mill, screens 174
mills, plates in 788
stamp mills 226
mill, stamps in 228
Amalgam absorbed by plates 765
amount of bullion in 761
bullion contents of 783
cleaning of 250, 780
distribution of, from plates 764
fineness of 764
general discussion of, Leon de Mortillet 2025
gold 731
and silver in hard 762
in 767
kettle 758
nature of 208, 1512
plain copper plates coated with 747
presses 1517, 1518, 1519
produced by fine gold, hard, A. L. Collins 2024
proportions of gold and silver in 762
recovered by sweating plates 759
remedy for hard. E. Woakes 2024
removal of impurities 251
retorting 781
right consistency on plates 756
scoop 758
silver 731
sodium 730
specific gravity of 1188
squeezer at the Alaska-Treadwell, hydraulic .. 2024
power 1519
squeezing of 781, 1517
strainer 781
treatment and retorting of 2024
used on copper plates 747
Amalgams 730
Amalgamated copper surface on Gilpin County tables 681
Amalgamated plates 731 1014, 1512
See also Plates.
absorption of mercury by 1514
amount of drop 743
at Mill 98. 622
at Mill 96, details of 1618
clean up 203
details of in the mills 737
distributors and collectors used on 743
dressing of. W. H. Kritzer 2024
for testing 1156
heavily silver plated. F. W. Cindel 2024
inside 178
material for 1514
Muntz metal for 1512
on Wilfley table 1656
quality of copper for 747
silver plated 1512
slope of 744
speed of waves and thickness of films 746
suggestion is made that pulp flow across. J. R. Sears 2024
Amalgamating device, a laboratory. H. S. Guess ..2024
mills, bibliography for 1173
for silver ores 1039
pan 232, 239, 777
bibliography for 290
Boss type 242, 244, 245, 246, 247
circulation of pulp 241
cost of 250
Amalgamating pan dies 245
E. P. Allis Co. 244, 245, 246, 247, 249
for testing 1157
pan, frame, bottom, and central cone..... 241
Fraser & Chalmers 244, 245, 246, 247, 249
in Lyon mill 241, 243, 244, 246
loss of mercury in 250
method of working 248
power, wear, losses of iron and mercury 249
Risdon Iron Works 244, 245, 246, 247, 249
shafts and gears 248
sides, flanges, ring, lining, covers 244
size of stuff treated by 248
spider, driver, cap, lubrication, and grinding..... 247
steam pipe and steam jacket 244
tank and Boss systems 248
temperature of 248
Union Iron Works 243, 244, 245, 246, 247, 249
weight of spider and driving cone in 247
wings, muller, shoes, and pulp current 245
tables, back deflectors for 1514
Krupp 788
shaking 1513
Amalgamation 730, 892, 1512
agitators for 780
an improved process for. A. C. Beatty 2024
apparatus for 731
at mills 1516, 1638, 1663
bibliography for 787
bottle amalgamation for testing 1996
combination process of 248
description of a new machine for 2025
effect of arsenic on 1654
solutions of salts 767
temperature on 766, 1516
J. J. MacDowell 2024
C. W. Merrill 1520
followed by agitation 891
concentration 1616, 1652
and lixiviation of concentrates 1616, 1620
and tailings 1616, 1617
of tailings 1616, 1623
lixiviation 1616, 1634
and concentration 1616, 1631
in New Zealand. J. Park 2024
the Southern Urals. C. T. Nissen 2024
inside of batteries at Mill 112 1658
the mortar. C. DeKalb 2024
loss of gold in 786
of auriferous pyrites 2024
gold ores. T. T. Read 1520
new plates 752
pan amalgamation 1517
plates, an article on. N. S. Keith 2024
of Muntz metal 2024
preparation of pulp for 1514
principle of 4, 2024
Reese River process of 248
settlers for 777
side shake 2025
sizing before 1514
temperature at Mill 106 1640
tests 1156, 1167
J. R. Cooper 2024
use made of, in mills 890
of copper plates for. E. Halse 2024
versus concentration in Gilpin County 1047
Washoe process of 248
Amalgamator, Bazin's 787
Eureka rubber 776
Gowan's 789
Hewitt's 788
King gold 777
Lagarrigue Sutil 2024
Lancaster gold. J. H. Lancaster 1530
new type of 2024
Pierce 1520, 1517
Amalgamators 775, 1517
amalgamating pans 777
American ball pulverizer 234
bibliography for 295
Blower Company fans for furnishing air to pneumatic tables at Mill 151 1804
Concentrator Company, Knowles New Century magnetic separator 1541, 1568
jig mechanism 537
New Century Blake breaker 1222
jigs 1459

American Developing and Mining Company mill xxvii, 1028
filter press at Mill 102 ... 1630
gauge ... 1194
gold stamp mills ... 1178
improvements in ore dressing ... 1175
Process Company driers ... 1597, 1609
rock breaker ... 59
screen gauge ... 172
Smelters Securities Company, Tecolotes mill .. 1748
steam stamp ... 2011
Steel Mfrs. Association on screen gauges ... 173
wire gauges ... 227
Zinc Extraction Co., international separators at .. 1535
Lead & Smelting Co., Huff electrostatic separator ... 1552
Americus Zinc and Lead Mining Company, separation of zinc blende and barytes ... 1565
Amicus mill, milling cost at ... 1640
Ammeberg, heating ore for friability ... 9
Heberli mills at ... 259
jig at ... 641
bed at ... 574
mill at ... 911, 1086, 1121, 1176
picking at ... 492
removal of slimes by classifier ... 373
screening at ... 373
separation of pyrite and blende at ... 829
sieve scale at ... 367
Utsch jig at ... 520
Ammonia used on amalgamated plates ... 753
Amortization of capital ... 1128
Amount and temperature of water for gravity stamps 221
of mercury fed to stamps ... 208
throw of jigs ... 594
Amperes. See also Power.
Ampere turns for magnets ... 794
Amphibole, specific gravity of ... 1188
A. M. W. mill, Leadville, milling at the. A. W. Warwick ... 2043
Amygdaloid ore, mills for ... 990
Anaconda classifier ... 395, 396, 476
coal washer ... 2018
concentration at. M. Schwerin ... 2037
concentrator. D. E. Woodbridge ... 2040
Copper Mining Co. ... 1836
Huntington mill screens at ... 1317
in 1905. L. S. Austin ... 1922
mill ... xxvi, 984, 1181, 1182
plant of ... 2037
H. O. Hofman ... 1922
rolls at mills ... 1822, 1824, 1828, 1829
Analcite, specific gravity of ... 1188
Analyses of Cammett table products ... 678
of canvas table products ... 701, 702
crude ore and concentrates at Mill 167.. 1858, 1859
Luhrig table products ... 670
mill products. See individual mills in Chapter XX
products at Mill 162 ... 1847
of Anchor mill ore ... 815
Ball-Norton magnet ... 798
Golden gate table ... 682
Hallett table ... 676
magnetic separation. 802, 803, 804, 809, 810, 813
Parsons table ... 669
pneumatic belt concentrator ... 818
Richards annular classifier ... 406
roasting for magnetism ... 815
slime table ... 1172
roasted products ... 814
vanner products ... 650, 664
Wilfley table products ... 674
Analysis by specific gravity tests ... 1159
for minerals ... 1162
of Butte ore ... 135
Morison's curves of velocity of stamps ... 215
products of disintegration and screening ... 830
of dry separation ... 820
Krom air jig ... 824
magnetic separation ... 802
oil process ... 832
Paddock air jig ... 823
separated by decrepitation ... 829
See Assaying.
Anchor mill, roasting and magnetic tests on ore ... 814
speed of jigs at ... 593
Andalusite, specific gravity of ... 1188
Anderson's concentrating mill ... 1184
Andesine, specific gravity of ... 1188
Andesite, weight of ... 1190
Andrée, Th. Dressing of graphite in Austria and Bavaria ... 1177
Andrews dredging pump ... 869
Angels, California stamps at ... 228
Camp, California, arrastra at ... 1039
mills at ... 1024, 1033, 1034, 1038
shoes and dies at ... 183
stamps at ... 224
Angle irons in launders ... 872
of friction ... 1244
in trommels ... 374
of nip, formula ... 93
gyratory breakers ... 1218
how affected ... 94
of rolls ... 89, 109, 110, 1226
affected by speed ... 94
slide of ore ... 337
Anglesite, specific gravity of ... 1188
Angleur, double discharge on jigs at ... 584
Anhydrite, specific gravity of ... 1188
Animal oils ... 1098
Ankerite, specific gravity of ... 1188
Anna mill ... 1177
wire rope in ... 1096
stamp mill, spitzlutten at ... 423
Works, hand picking at ... 492
Annealing copper plate ... 747
graphite crucibles ... 784
iron for permeability ... 792
Annular picking table ... 490
Allis-Chalmers type ... 1435
Krupp type ... 1437
vortex classifier ... 406
Anodes used in electroplating copper plates ... 755
Anorthite, specific gravity of ... 1188
Anthony, W. A. Edison, Buchanan, and Wetherill separators ... 834
Anthracite, angle of nip required to crush ... 94
hindered settling test on ... 617, 622
settling velocity of ... 466, 469
specific gravity of ... 1188
Antidote for mercury ... 730
Antimony amalgam ... 730
atomic weight of ... 1188
hindered settling test on ... 614, 617
ore concentrated by Hooper air jig ... 823
separated by oil ... 831
settling velocity of ... 466, 469
specific gravity of ... 1188
Antioquia, Colombia, amalgamated plates at ... 749
Anvil blocks for Nordberg steam stamp ... 1247
Anzin Company, air blast for coal dust ... 838
using air blast ... 817
Apatite, mill for ... 1059
specific gravity of ... 1188
used in making phosphate ... 815
Apophyllite, specific gravity of ... 1188
Apparatus, accessory ... 842
used for amalgamation ... 731
Appendix ... 1187, 1999
bibliography for ... 1173
Appleby, C. J. ... 229
Appliances for elevating ore and water ... 859
Application of magnets ... 790
riffles ... 723
Apron distributors ... 857
for feeding slime tables ... 689
jigs ... 549
plates ... 740
Aragonite, specific gravity of ... 1188
Arcadian mill ... 131
Archer breaker ... 57, 58, 60
Archimedean screw for jig tailings ... 588
Archimedes screw dredge ... 1009
Arc lamp at Mill 152 ... 1931
lights ... 1100
Area of amalgamated plates ... 744
discharge for stamps ... 209
steam stamps ... 129
sorting column ... 403
Argall, Philip. Capacity for rolls ... 1226
cylindrical driers ... 1599
driers ... 880, 1600
and drying of ore ... 1609
dry crushing ... 2010
economic range of gravity stamps ... 1276
feeding tube mills ... 1288, 1323
four-tube drier at Bessie mill ... 1600
Metallic plant ... 1600
grinding pans *versus* tube mills ... 1282

Argall, Philip, ideas on a modern fine crushing plant.. 2018
jig 639
journal pressure in rolls 97
limit of economical sizing 1366
modern crushing and grinding machinery 1278
multi-tubular drier at Mill 143 1770
on Gilpin County mills 1047
rules for sampling 848
roll shells 69
screens 385
ore dressing in British Columbia 2042
question of hole *vs.* mesh 1366
rolls 1230
for dry crushing 1224
sampling and dry crushing in Colorado 1244
of ores 1609
screens, kind, speeds, and cost of screening ... 1365
settlement of slimes 1417
settling of roasted slimes 1419
speed for rolls and speed curves 1224
standardization of screens 2020
use of Vezin sampler 1572
Argentite, specific gravity of 1188
Argon, atomic weight of 1188
Arithmetical ratio for sieve scale 367
Arizona and Sonora. D. E. Woodbridge 1923
concentration at Humboldt. A. H. Hamilton . 2038
in. F. H. Probert 2037
of copper in. F. H. Probert 2033, 2041
concentrators in. A. Morison 2042
Copper Company. D. E. Woodbridge 1923
Limited 1868
mill of. A. Morison 2041
use of lime for slime settling 1416
districts. Cost of producing copper in 1953, 1954, 1955
gasoline engines in 1184
milling at Mowry 2042
milling practice in. D. E. Woodbridge 2038
mills in 1005, 2043
slime treatment in 1411
stamp mill 1175
type of settling tanks at Morenci 1413
Arminius Chemical Company 1913
mill 1913
Armitage, H. E., adjustments of jigs 640
double-cone classifier 426
on making bed material for jigs 574
spitzlutte. Hopper-shaped unwaterer 476
Arrangement of holes in screens 168
trommels 384
machinery in a modern mill. A. Harvey 2048
machines 891
mills 1086, 1107
plates 737, 742
screen holes 369
trommels 364
Arrastra 232, 237
bibliography of 289
description of the. A. Lakes 2013
discussion of construction. E. L. Ballou 2016
mill 1039
value of the. M. F. Leech 2014
Arrastras, number used 231
Arsenic amalgam 730
atomic weight of 1188
in amalgam 767
specific gravity of 1188
Arsenolite, specific gravity of 1188
Arsenopyrite, hindered settling test on 616, 617
roasted for porosity 829
settling velocity of 466, 469
specific gravity of 1188
Artesian well for water 1105
Asbestos board used in retorting 781
covering for steam pipes 1091
dressing 817, 838, 1079, 1178, 1182
in Quebec 1916
R. Stokes 2046
methods of treating. E. B. Wilson 2041
milling of. F. Cirkel 1568
E. S. Regelman 2036
in Canada. F. Cirkel 2034
Ascending-current cones or cylinders 1402
Ashes used in preparing amalgamated plates 756
retorts 781
Ashio mill, Japan 2047
Aspen, Colorado, electric power at 1091
hammers used 10
mill at 933, 1004
Aspen, Colorado, rock house at..... 485
Asphalt floors in mills 1088
Asphaltum, specific gravity of 1188
Asphalt varnish used in electroplating 754
Assaying tests 1163
Assáy office 1160
for mill 1088
of tailings at Mill 48..... 130
Assays and sizing test of feed and products of Huntington mills 1317
of jig tailings 607
mill products Mill 142..... 1767
minerals 1162
products at Mill 129 1718
of Paddock air jig 823
stamp pulp 211
tailings 213
zinc mill products 1169
See also Analyses.
Atacama, Chili, mill at 1182
mill, Taltal, Chili. S. H. Loram 2033
Atacamite separated by screening 830
specific gravity of 1188
Athabasca mine, British Columbia, milling at the. E. N. Fell 2034
Atkinson, A. S. Lake Superior milling practice ... 1419
Atlantic mill 1175, 1180, 1183
cost of breaking at 51
crushing at 57
mining and milling 1131
steam stamping 142
details of cylinders of steam stamps 126
Evans classifier in 395
launders at 873
screen for stamp.. 121
slime tables at 697
steam stamps 120, 135
Mining Co. 1181
Atlas engine 902
Atlin district, B. C., dredging in the 2037
Atmosphere, weight of 1188
Atmospheric discharge for jigs 583
stamp 140
Atomic weights, table of 1188
Attaching jig screens 539
Attachment of jig plunger to connecting rods 529
screens in trommels 355
Attendance required by American Process Company driers 1599
Blake breaker at Mill 186 1917
Gates breaker at Mill 159 1828
Pierce amalgamator at Mill 114 1663
rotary drier at Mill 186 1917
steam stamps at Mill 182 1912
Wetherill magnetic separators 1525
Wilfley roasting furnace 1548
Attraction of various substances by magnets 796
Attrition causing slimes 1121
Atwood amalgamator 775
Atwood, M. Microscopic examination of pulp 228
Augite, strength of 301
Aultman balanced shaking screen 2018
jaw breaker 2009
Auriferous antimony ore, concentration of an 2030
Aurora mill, jigs at 641
pointed boxes at 477
Austin gyratory breaker 1210, 2009
Austin, L. S., Anaconda Copper Company in 1905 1922
Deister concentrator at the Baltic mill 2023
Washoe Plant of the Anaconda Copper Company 2033, 2043
Austin Manufacturing Company. Cost of breaking ore 1222
Austin gyratory breakers 1222
Austin, W. L. amalgamating pan, Boss system..... 291
at the Harshaw mill 290
Boss tubular classifier at Harshaw mill 478
gravity stamps 224
grizzlies in the Harshaw mill 385
milling at Harshaw and Charleston mills, Arizona 1174
on impurities in amalgam 251
settlers and retorts at the Harshaw mill 787
wear of amalgamating pans..... 249
Austinville, Virginia, mill at 1065
New Century jig at..... 1446
zinc ore from 809
Australasian practice 1713
Australia, amalgamated plates in 737, 742, 745
concentration in 2033

Australia, details of stamps 226
dredging in 1009
dry concentration in 837, 838
panning in 825
Hancock jig in 504
mercury wells and riffles in 769, 770
metallurgical practice in West. R. Allen 1323
mill practice in. W. T. Saunders 2039
Western. R. Stokes 2046
plates in 788
stamp mills in 1180
stamps in 226, 227, 229
treatment of lead zinc ores in. V. F. S. Low .. 2034
low-grade copper ore in. J. J. Muir 2039
ore at the Lucknow gold field. A. R. Canning 2040
water used in stamp mills 222
Australian gold mills 1110, 1119
Metal Company's mill, Ullrich magnetic separators at 1535
practice, grinding pans in 1283
Austria, chromite mill in 1073
graphite dressing in 1177
mills in 1075
Austrian graphite mill, kieves in. 727
Author's tests on jigging mixed sizes 630
suction 627
Automatic discharges on jigs 553, 576, 577, 583, 584
stay box for 584
feeders 853, 854, 855, 856
ore feeders 1578
samplers Vezin-type at Mill 167 ..... 1857, 1858
at Mill 172 ..... 1873, 1874
tripper at Mill 174 1883
Avery automatic scales at Mill 105 1635
Avoirdupois weights, equivalents of 1187
Axinite, specific gravity of 1189
Ayton intermittent pulp thickener 2020
thick pulp extractor 1419
at El Bote mill 1408
Azurite, specific gravity of 1189

B

Babbitting rolls 73
Babbitt metal for bearings 1098
effect on mercury 751
Babcock & Wilcox boiler 910, 1090
Back plates, disadvantages of 178
Bacon, Earl C. viii
rolls at Mill 152 1807
Bad-Ems, Prussia, mill at 1177
Badoureau, A. Free settling in water 477
Baffle board in mercury wells 768
settling tank 459
plates in distributors 857
driers 882
to settle dust 1099
Bag room for dust 883
Bailey, G. E. Gold stamp mills 1183
Baize for tables 703
tables on dredges 1012
Baker, G. W. Blake breaker 58
on breakers 58
Krom jig 838, 839
Krom's improvements on Cornish rolls 110
Balanced rolls, Sturtevant 1232
Balancing of shaking screens 342
Balch magnetic separator 834
Baliol mill 1184
Ballarat, amalgamated plates at 745
plates at 788
single discharge at 209
stamps at 226
Victoria, mills at 1180
Ball, C. M. Ball-Norton separator 833, 1175
Cummings mill 292
equations for concentration 1176
on power used for crushing 309
Ball mills 233, 260, 1285
Allis-Chalmers 1323
amalgamation 1156
an article on the 2014
as re-grinding machines 1332, 1333
at mills 1828, 1829, 1830, 1914
best size of feed for. H. J. Brooke 1323
bibliography for 293
continuous, dry, sieveless 2017
discussion of 2015
Ferraris 1280, 1299, 1323
Ball mills, Ferraris, capacities of 1300
table of sizes, power, weights, etc. 1300
fine grinding 2015
for clays 2013
Gates 1280, 1300
table of sizes, capacities, power, weights, etc 1300
general notes on 1301
Humboldt Engineering Works Company 1315
in Australia, capacity, speed of 2028
Krupp 1231
number used 340
operation of. H. Fischer 1302
sizing test of ball mill pulp 1315
on 2017
using rollers. E. Poetgens 1830
versus rolls at Mill 159 1916
stamps as slime makers at Mill 185 1303
wear of steel balls in 2017
wet 2016
with dust separator 2017
a fines separator 2028
Ball-Norton magnetic separators 797, 1527, 1568, 1527
at Mill 158 1826
belt-type at Mill 158 .... 1822, 1824, 1825, 1822
drum-type at Mill 158 ..... 1821, 2028
results at Port Henry on a 2028
type 'M' at Mill 158 .... 1822, 1823, 1825, 1826
Ballou, E. L. Stamping and concentration on sulphide gold ore 1184
Ball's revolving knife buddle 328, 334
Ball steam stamps 114, 118, 119, 120, 121, 122, 123, 124, 126, 127, 128, 130, 131, 132, 133, 134, 142, 143
valve motion 123
Bally balanced cam 226
cam 228
Baltic mill, Redridge, Michigan. E. D. McDermott 2040
W. McDermott 2041
Baltic mill, Redridge, Michigan 2044
Mining Company 1895
copper hand book 1925
Banking in stamp mortar 215
prevention 218
Banks on vanners 652, 656, 662
Bank, thickness of, in trommels 378, 380
Banner mine, concrete mortar block 148
Barber, G. M. Grüson ball mill at Atacama, Chili . 1182
Barbour, T. J. Dredging in California 1182
Bardwell, E. S. Free-settling velocities 1421
sorting tube for testing 1988
Barge with log washers 326
Barite, angle of nip to crush 94
decrepitation of 829
dressing at Long Island. E. K. Judd 2027
methods used in dressing. E. Higgins, Jr. ... 2026
specific gravity of 1189
washing 1173
in Tennessee. E. K. Judd 2027
Barium, atomic weight of 1188
Barlor, J. C. Sampling of concentrating tables ... 2032
Barnaby, G. A. Free-settling velocities 1421
Barnhardtite, specific gravity of 1189
Barnhart, G. A., on Griffin mill 284
Barrel for clean-up 234, 264
Barrels for shipping concentrates 1112, 1113
Barren Springs, Virginia, iron ore from 809
Bar riffles 721, 724
screens 336
Barry tube mill lining 2014
Bars for supporting jig sieves 539
Barth, C. Krom's rolls *vs.* stamps 112
stamps and rolls 229
Barth, K. Ball, Leavitt, and Allis stamps 142
Blake and Krom breakers 60
on breakers 60
Bartle pulverizer 233
bibliography for 294
Bartlett 1004, 1119
and Snow Company, driers 1609
the C. O., drag or disc conveyors 1583
friction clutches 1067
Grill four-compartment driers 1597
fine crushing mill 1004, 1005
Bartlett, F. L. Concentrating blende 1183
jerking table 492
milling 1181
Bartlett, J. C. Pneumatic concentration 837
picking table 489
Simplex concentrator 1487

Bartlet, J. C., table 678, 680, 1153, 2022
in Germany 2023
used as jigs at Mill 142 1767
Bartola pan 1036
Bartsch breaker 61
bumping circular table 691
rotary percussion tables at Mill 150 1800
rotary percussion table, the 1497
round table 2022
Barus, C. Settling in liquids 1186
settling of very fine particles in liquids 477, 479
tests on clay particles 474
Barytes and zinc blende, separation of by decrepitation 1565
Basalt, strength of 301
Base metals, effect on mercury 751
in bullion 785
Basin Reduction Company 1848
washers for clay 333, 335, 1076
Batea 1152
belt for vanners 657
mechanical 683
Bath for silver plating 755
Batopilas, amalgamating pans at 291
Mexico, Silver Mill at 1174
Battens for mills 1088
Battery, Boss standard 1267
cloth, brass and iron 171
construction 2012
frame, cantilever. I. C. Boss 1278
M. P. Boss 2012
description of a 2012
screens at Mill 96 1618
Foote screen 1270
gun-metal at Mill 185 1915
standard ten-stamp 1267
water, the temperature of the 2012
Baugh's mill of cone type 292
Baum jig 519, 643
coal jig 523
advantages of 519
air pressure and gravity 537
disadvantages 519
discharge 581
mechanism 537
washing-plant. Barnsley, Eng. 2051
Herne coal washing jig 2021
Bauschinger, J. Strength of stone 316
Bauxite, specific gravity of 1189
Bavaria, graphite dressing in 1177
Baxter breaker 56, 58, 60, 61
Bayliss, R. T. Amalgam on plates 787
on Blanton cams 194
Bay State Mining Company mill ..... xxvii, 1023
Bazin's amalgamator 787
Beach Glen iron ore concentrated by magnets 802, 803
Beakers for settling tests 1146
Bearings for cam shaft 190, 191
rolls 72
Beason, L. H. Boston Con. Mg. Co. mill, Garfield, Utah 2038
the mill of the Utah Copper Co., Garfield, Utah .. 2045
Beatty, A. C. An improved amalgamation process 2024
Beaumont, W., on breakers 59
Cole's stone breaker 59
Becker Foundry & Machine Co. 30
Becker, G. F. and S. F. Emmons. Amalgamating pans 291
amalgamation 789
arrastra 290
edge runners 295
Becket Foundry & Machine Co., rolls 76
Beckett and McDowell geared rolls at Mill 183 1913
Bedding for jigs 1458
Harz jigs at Mill 183 1913
Bed of hand jig 894
of jigs 495, 552
effect of 1463
material for 573
size of grains for 575
tests on 630
on concentrators, depth of 1510
on vanners, thickness of 660
proper condition of, on jigs 595
thickness of, on fine concentrators 644
Beguelin mine, Blake breaker at 1621
Belgium, jigs in 641
mills in 1176, 1185
phosphate dressing in 899
Bell discharge for jigs 582
Bellom, M. 1185
breakers 57, 60, 61
capacity and water for classifier 432
drum separator at Friedrichssegen 833
finest size jigged 606
hand and machine breaking. Schranz breaker. 57
jigs 641
on number of sieves for jigs 590
ore dressing in Saxony, The Harz, and Rhenish Prussia 1176
pneumatic machine at Himmelfurst mine 837
pointed boxes at Friedrichssegen. Meinecke hydraulic classifier, Meinecke spitzlutte 477
Schranz breaker 60
Schranz mill 290
Stein belt table and Linkenbach slime table ... 728
trommels. Schmidt spiral sieve 385
value of hand picking 492
Bellevue coal washer, Scranton, Penn. G. W. Harris 2051
Bell, R. Concentration in British Columbia 2034
dredging on the Snake River, Idaho 2036
Grasshopper Creek 2041
Bell, Robert N. Note on Triplex rolls 1244
Belpair boilers 992
Belt and pulley for trommels 356
batea 657
Blasdel 647
canvas used in Mill 41 650
concentrator, air 818
conveyors 859, 861
at mills 1631, 1670, 1690, 1691, 1706, 1708, 1709, 1710, 1735, 1750, 1759, 1760, 1762, 1763, 1764, 1768, 1769, 1771, 1772, 1828, 1851, 1853, 1868, 1869, 1876, 1913
for dredges 1012
picking on 489
rubber 859
driven pumps 871
elevators 862
film tables 697
Brunton table 698
Castelnau table 698
Ferraris table 698
Uren table 698
for vanners 647, 655, 657
Loring 647
percussion table 1496
rope and plate conveyors for hand picking ... 489
screens 1357
Callow screen 1358
Dunlap perfect clay screen 1357
tables 669
bibliography for 728
travel on vanners 658, 660
Woodbury 197
Belted rolls 75
Belting used on amalgamated plates 760
Belts 1176
and pulleys 197
conveying 1585
proper speed for belts in Wetherill magnetic separator 1523
corrugated 647
corrugated *versus* plain 650
cost of for vanners 663
"crack-proof" vanner belt 1503
for gravity stamps 197
for hand picking, speed and capacity of 1438
for mills 1093
link 860
magnetic separators with 804
of vanners, details of 648
or tables for hand picking 1435
picking and sorting belts at Mill 137 1438
Robins conveying and picking 1438, 2021
sizes of, for rolls 97
Spadone concentrator belt 1503
take-off, in Wetherill magnetic separator, width thickness, and proper speed for 1524
Bendigo, amalgamated plates at 745, 762
Australia, mills at 1180
milling practice at. H. C. Boydell 2044
gold milling practice in. H. C. Boydell 2034
iron stamp frames in 160
plates in 788
shoes and dies at 183
stamps at 226
Benedict, W. de L. Log washer in South Carolina 1180
washing plant 335
on wash trommels 333

Benson mines, magnetic separation at 798
Berdan's amalgamating pan 291
Berenger and Stingls slime tank 1407
Berlin, tests on strength of stone at 301
Berrigan centrifugal separator 2023
Bertha Zinc Co., mill 1180
Works 1105
Berthelet inclined screen 2018
Berthierite, specific gravity of 1189
Bertrand mill, rolls at 110
Beryl, specific gravity of 1189
Bessemer steel for shoes and dies 185
Bessie mill, Argall 4-tube drier at 1600
Bethune Mining Co., France, surface equipment for coal washing at the 2051
Bettel, W. Definition of slimes 1397
Beuthen, mill at 1177, 1186
Upper Silesia, mill at 1087
Bevel gears 1096
Bibliography for adhesion 839
amalgamation 787
appendix 1173
breakers and hammers 57
centrifugal separation 839
classifiers and laws of classifying 475
decrepitation 839
disintegrating and screening 839
dust chambers and bag houses 885
elevators and conveyors 884
feeders and distributors 884
gravity stamps 223
hand picking 492
jigs and laws of jigging 639
kieves 727
launders 885
laws of classifying by free settling in water . 475
crushing 315
jigging 639
magnetic concentration and roasting for magnetism 832
mills and general milling 1173
pneumatic concentration 837
preliminary crushing 55
washers 334
pulverizers 289
pumps 885
riffles 727
roasting for friability 839
roasting for porosity 839
rolls 109
sampling 884
screening 384
steam, pneumatic, and spring stamps 142
vanners, tables, riffles, and kieves 727
weathering 839
Bigelow patent breaker 2009
Bilharz cobbing magnet 1532
at Mill 126 1532
O. and E. W. Neubert. Dressing at Freiberg, Saxony 1174
Bilharz, O. xix
Altenberg classifier and Rittinger *spitzlutte* 478
Ball stamps 142
Bilharz belt-table 729
hydraulic classifier, siphon separator, Altenberg classifier, Bilharz *spitzlutte* 475
jig 641
movable sieve jigs 643
table, Frue vanner, slime table, and buddle 727
versus Rittinger *spitzlutte* 476
Blake, Kley, Gates, and McCully breakers 55
Carnall and Crickboom wash trommels 334
Carr disintegrator 298
Dingey mill 293
edge runners 295
general milling 1173
gravity stamps 223
Griffin roller mill 297
grizzlies, riddles, and trommels 384
Grüson ball mill 293
Heberli mill 292
Heberwäsche, Harz jig, Bilharz jig 639
Himmelfahrt mill at Freiberg, Saxony 1182, 1185
Huntington mill 296
milling in Missouri 2034
Pape-Henneberg separator and Krom jig 837
dry concentration 837
picking houses 492
Rittinger's principles 1175
Schwarzmann's rolls 109
Bilharz, O. *spitzlutte* 423
test of jaw and Blake breakers 54
wash trommels 332
Wenström, Lovett-Finney, Chase separators .. 832
Bilharz circular jig 518
sieve power jig 504
classifier 475
improved Rittinger *spitzlutte* 478
oblong movable sieve power jig 503
spitzlutte 477
table 669
capacity of 504
at mills 1659, 1789, 1790, 1791
Billek, J. Concentration on galena-blende-pyrite at Maiern 1185
picking in mine and mill at Maiern, Austria 493
separation plant at Maiern; Siemens and Halske separators 836
Bin and feed chute for steam stamps 129
Bingham, Utah, mill at 913
milling the ores of. W. R. Ingalls 2039
Binkley, George E. Settling system 1409
Bins 842, 1027, 1570
at mills 1742, 1743, 1760, 1761, 1762, 1763, 1857
concentrate drying 1570
discharge chute in 843
drier, at Mill 100 1625
filter 1570
for concentrates 1112
of the Wolverine mine, drawings of the ore ... 2032
sizes and capacities. See individual mills in Chapter XX.
stamp 128
with steam pipe for drying products at Mill 125 .. 1705
Biotite, separation from molybdenite by magnet ... 1568
specific gravity of 1189
Birkinbine, J., and T. A. Edison. Blake system .. 57
Buchanan, Wenström, Conkling, Monarch and Edison separators 833
breakers 57
concentrating iron 1175
Conkling separator 833
cost of breaking at Atlantic mill 51
crushing at Atlantic mill 57
magnetic concentration 1175
milling at Atlantic mill, Lake Superior 1175
Lake Superior 1175
Birmingham gauge 1194
Iron foundry 76
screen gauge 172
Bismuth amalgam 730
atomic weight of 1188
Bismuthinite, specific gravity of 1189
Bismuth removed from mercury 786
specific gravity of 1189
Bituminous coal, specific gravity of 1189
Blackhawk breaker of Dodge type 31
Colorado, mill at 1035, 1048
Black Hills, breakers at 57
cost of gold milling in 1132
crushing in cyanide solution in the. C. H. Fulton 2033
district, South Dakota, cost of producing gold in 1977, 1978
grizzlies in 385
mercury trap 773
mills in 1175, 1176, 1181, 1182
plates in 787
stamps in 224, 227
steam stamps in 135
wet crushing cyanide mill in the. E. B. Sawyer. 2044
Black Pine, Montana, mill at 1175
Black sands 1008, 1013, 1017
by U. S. G. S., investigation of 2042
Caribou riffle for treating 1509
concentration by the U. S. G. S. K. Thomas . 2046
of 2038
D. T. Day, R. H. Richards 2047
device for saving. W. Brazenall 2038
Leighton separator for 1528
method of recovering gold from 1654
problem of the. F. Powell 1511
tests on at Dawson 2034
treatment of 2028
J. A. Edman 2025
California 2027
Blacksmith shop for mill 1087
Blades in centrifugal pumps 869
Blaisdell aerators at Mill 109 1650
centrifugal sand distributor 1602
Company. Blaisdell mechanical ore machinery 1609

Blaisdell distributor 1600
excavator 1600
at mills 1670, 1868
mechanical mixer 1603
sand distributor 1670
slime agitator 1602
system of mechanical ore handling 1600
Blake breakers 13, 55–61, 1223
at mills 1617, 1618, 1621, 1624, 1724, 1737, 1742, 1749, 1769, 1792, 1802, 1821, 1823, 1824, 1837, 1842, 1853, 1882, 1883, 1917
author's tests on samples crushed in 311
Carterville Foundry & Machine Works 1201
Case laboratory breaker of the Denver Fire Clay Company 1204
comparative wear of metals in jaws 48
compared with Dodge 33
Gates 52
Denver Engineering Works Company 1203
design of 1201
details of from the mills 23
sizes 16
Eli Whitney 13
Farrel Foundry and Machine Company 34
for testing 1137
Gates Iron Works 34
horse-power required 17
Humboldt Engineering Company 1205
information on 18, 1223
Krupp rock 1202
lead ore crushed in 274
lever type 21
life of wearing parts of at Mill 139 1221
National Drill and Manufacturing Company's . 1203
New Century Blake 1203
operation of 16
Sturtevant roll-jaw 1205
toggles used for pounding blocks 489
Von Reytt's tests 305
wear of 25, 48
Blake challenge breaker 20, 59
Blake-Denison continuous weighers 1603
Weigher Company. Blake-Denison Weighing machine 1609
at mills 1832, 1860
Blake double jaw breaker at Mill 158 1824
Blake, L. I. Blake-Morscher separators 2027
electrostatic separation 1550
magnetic separator 833
Blake-Marsden fine breaker 56, 58
breaker at Mill 185 1915
Blake-Morscher electrostatic separator. A. H. Plomb ore separator 1550, 1611
at Montana Zinc Company's mill 1551
separator, description of the. L. I. Blake . 2027
separator. W. McA. Johnson 2026
at Mill 140 1551
treatment of milling at Mill 131 1551
Blake multiple jaw breaker 28
pump 1008
T. A., and S. R. Krom. Improvements by Krom 59
Blake breaker 57
of Chateaugay Ore and Iron Co. 59
multiple jaw breaker 57
system 60
breakers 57, 59, 60
edge runners 295
edge stone mills 269
Haile Gold mine, North Carolina, and Chateaugay Ore and Iron Company, N. Y. 1175
rock breaker 20
wearing parts for breakers 48
W. P. Amalgamation 789
Blake magnetic separator 833
breakers 57
Howland's stamp battery stamp mills in California, Australia, and Brazil. German overflow battery, Rittinger stay battery 229
Huet & Geyler's settling cylinder, Hundt's settling tub and Rittinger's *setzrad* 478
jigs 640
pivoting of jaw 57
reverberatory furnace designed by 829
separating blende and pyrite 829
separating pyrite 833
separation processes 839
silver milling at Butte, Montana 1175
two-stamp steam battery 143
Wimmer's, Rittinger's, Harz, and Huet and Geyler's jigs 643
Blanding, L. Amalgamation 789
Blandy, J. F. Ball stamp 142
pneumatic stamp 143
Blanket concentrating tables at Mill 118 1677
for mortar blocks 148
tables 703, 749, 1464, 1507
tables on dredges 1012
under amalgamated plates 735
used dry for concentrating 825
in sweating plates 759
Blanks for accounts 1124
Blanton cams 193, 225, 228, 229
Blasdel vanner belt 647
Blasting in the mine 9
Bleaching powder 1167
Bleiberg, Rittinger tables at 668
Bleichert aerial tramway at mills 1719, 1769
wire tramway 937, 1016
Bleischarley mill, Silesia, dry concentration at the .. 2039
mine, mill at 1186
Blende and pyrite separated by disintegration 830
roasting and magnetism 814
separation 839, 900
siderite separated by roasting and magnets .. 799
crushed by rolls 62
jigs in Missouri, capacity of 602
mill for 902, 907, 908
ore, roasting of 57
test on 1168
weight of 1190
separated by decrepitation 829
from pyrite 829
quartz 720
separation at Ammeberg 9
weight of, ... 1190
Bleyberg, double discharge on jigs at 584
sieve scale at 367
Blinding of screens 175, 373
Blisters on amalgamated plates 760
Block corundum 1078
system of selecting ore 481
Block 10 mine 1713
Blömeke, C. Advantages of the Wetherill separator 2030
apparatus in German mills 1177
ball mills 293
Bartsch, Schranz, Luhrig, and Linkenbach tables 728
Bilharz and Schranz jigs 641
Braun jig and Harz eccentric jig 641
capacity of jigs 597
of trommels 360
coarse and fine crushing 2010
complete discussion of tube and ball mills 2016
concentrating at the Perm mine, Westphalia ... 1177
zinc and lead 1177
Dörnberg and Aurora concentrating plant at Ramsbeck, Westphalia 1177
German mills 2034
Gröppel concentrator 2023
hand picking at Ramsbeck, Westphalia. Cobbing table 492
Himmelfahrt ore dressing plant at Freiberg, Saxony 1177
jigs at Lintorf 641
in Aurora and Dörnberg mills in Westphalia .. 641
Káván-Rittinger, *vs.* Luhrig, Stein *vs.* Bartsch tables 728
labor for jigs 604
magnetic separation 2026
in Hungary 2040
separators 834
new jig screen 2021
ore dressing at Bad-Ems 1177
Beuthen, Silesia 1177
Clausthal 1177
Lintorf 1177
Silberau, Laurenburg, and Clausthal 1177
Pape-Henneberg apparatus 839
concentrator 837
pneumatic concentration 837
pointed boxes in Dörnberg and Aurora mill ... 477
riddles, trommels, and spiral sieves for coal 385
Schmidt spiral sieve 385
Schranz mill 296
separation 836
side plunger eccentric jigs 641
slimes at the Himmelfürst-Fund mine at Przibram 1177
slime tables 728
Stein, Schranz, and Rittinger tables 728

Blömeke, C. Stroke of jigs 594
trommels at Bad-Ems 385
use of wash trommels 2018
Wetherill magnetic separator 834
Blower for Krom jig 824
Blow of gravity stamps, effectiveness of 218
Blue Bell mine, British Columbia, proposed method of treatment at the 2042
Bird mill, sizing test of stamped ore 222
ground 1080
treated in South Africa 333
weathered at Kimberley 830
weight of 1191
Blue, F. K. Experiments with launders 1594
Boards, covered with amalgam 747
for mill building 1088
to catch gold on dredges 1012
Bobtail mill, mortars 164, 165
rate of crushing in 165
weight of stamps and mortars 164
Bodie, amalgamated plates at 766
plates at 788
stamps at 227, 228
Bogardus eccentric mill 233, 259
mill 232
bibliography for 292
Boggs and Clark centrifugal pumps at Mill 141 ... 1761
Bohemia, a mill in. O. Eypert 2047
graphite dressing in 1177
mill in 1075
Böhme. Strength of stone 316
Boilers 1090
in mills—see Individual Mills in Chapter XX..
Boiler tubes for launders 873
Boiling of jig beds 600
point of mercury 730
Bolivia, tin concentration in. J. D. Minchin 2038
dressing in 1084, 1183
M. Frochot 2033
W. McDermott 2040
Bolthoff rolls at Mill 166 1854
Bolton, R., on breakers 60
Lancaster breaker 60
Bolts for stamp mortars 148, 150
removal of 882
Bolzenmühle 236
bibliography for 299
Bonanza Co., use of lime for settling 459
mill, details of stamps 221
Bonita Mining Company, Lane slow-speed mill at . 1309
Bonne Terre, Missouri, breakers at 57
jigs at 640
mill at 924, 1175
Boot for elevators 862
Booth breaker 60
combination breaker 60
Borax for melting 784
Borchers, W. Concentration plant of the Sterling Zinc and Iron Co. 837
Bordeaux, A. Costs of concentrating lead zinc ores 2049
Borgmann and Emde revolving grizzly bars 386
screen 386
Bornite, specific gravity of 1189
Boron, atomic weight of 1188
Borotungstate of cadmium 1156
Bosco drainage boxes at Mill 113 1660
settling launders at Mill 113 1660
sizers at Mill 142 1767
Bosqui, F. L. Cyaniding at the Homestake mills .. 1925
definition of slimes 1398
Montana Tonapah mill 2038
treatment at the Combination mill, Goldfield, Nevada 2045
Boss amalgamating pan 242, 243, 244
Bosses, sockets in 187
table of details of 186
Boss, I. C. Cantilever battery frame..... 1278
M. P..... viii, 244, 426
amalgamating pan 239, 244, 245, 246, 247
battery at Mill 102 1630
cam key 1273
cantilever stamp-frame at Tonopah Mining, Milling, and Development Company 1272
cone classifier 425
definition of slimes 1399
individual mortars 1265
lever-operated latch finger for gravity stamps... 1273
muller and shoes made by 246
on slimes 1420
the Chili mill 1323
Boss, M. P., roller mill 1313
shoe and die channels in amalgamating pan of. 247
stamp head 1271
standard battery 1267
steel stamp battery frame 2012
wedge-grip tappet for gravity stamps 1272
Boss or stamp head 185
pans 241, 291
steam jackets in 244
system 290, 291
of pan amalgamation 248, 779
tubular classifier 478
Boston and Montana Consolidated Copper and Silver Mining Company mill ..... xxvi, 1841
Boston Consolidated Copper Company..... 1850, 1852
and Mining Company mill, Garfield, Utah.
L. H. Beason 2038
Nissen stamps at 1278
-Richardson Mining Company 1620
Bottle agitator 1157
amalgamation 1157
for testing 1996
Bottom bed in jigs, size of grains of 575
thickness of 575
material for 573
on Faust jig 548
jigs, defined 495
for amalgamating pan 241
ore bins 842
Boulder County, Colorado, cost of mining and milling tungsten ores 1987
dry separation in 820
Boulders in dredging 1011
Bourdais disintegrators 899
Bournonite, specific gravity of 1189
Bower's rolls 111
Bowie, A. J., Jr. 1197
Blake breaker at Father de Smet mill 57
Eureka rubber and traps in the Father de Smet mill 787
Father de Smet gold stamp mill 1174
gravity stamps 224
grizzlies in the Father de Smet Mill 385
hydraulic giants 334
hydraulicking 1006
hydraulic mining ..... xix 1173
mortars 164, 165
on grade of a sluice 723
riffles 721
timber riffle blocks 721
Box classifiers 432
surface current 433
whole current 443
distributors 857
feed for Wilfley table 1468
traps, Krupp type 1516
for mercury 773
Boxes for jig concentrates 586
cam shafts 190
rolls 72
in launders 875
Boys for picking 481
Braden Copper Company mill, Chile. W. Braden . 2039
Bradford eccentric jig 500
jig 334, 639
washer 330
Bradley, F. W. viii
Brass battery cloth, Tyler double-crimped 171
for jig screens 545
plate for jig screens at Mill 141 1760
screens 174
versus steel for jig screens 547
wire jig screens at mills 1686, 1714, 1743, 1744, 1750, 1751, 1752, 1753, 1867, 1877, 1878, 1879, 1902, 1903, 1904
Braun, Company, F. W. Sample grinders 1323
jig 641
double discharge on 584
sample grinder 1279, 1284
solution 1156
Bray coal screen 2018
Brazil, mining in. W. Maude 2035
stamps in 227, 229
Brazing of amalgamated plates 735
Breakage of stamp stems 188
Breakers, action of 55
Alden type 59, 61
Allis-Chalmers, Gates type 1222
American rock 59
Archer type..... 57, 58, 60

Breakers, at Mill 144 1771
attendance in Ontario mill 57
Austin gyratory breaker 1210
table of sizes, capacities, power, speeds, weights, etc. 1210
Bartsch type 61
Baxter type 56, 58, 60, 61
between feeder and stamps 2009
bibliography for 55
Blake and Gates compared 52
challenge type 20, 59
design of 1201
Kley, Gates, McCully 55
multiple jaw 57
type 13, 20
Brennan and Young 21
Colorado Iron Works 23
duplex breaker 21
Friedrich Krupp Grüsonwerk 23
Fulton Iron Works 22
Gates Iron Works 23
Giant Rock 22
Hercules rock breaker, Hendy Machine Works 22
Krom's sectional breakers 21
lever pattern 21
Minnesota Iron mine 23
Monarch breaker 20
Risdon Iron Works 22
sectional cushioned crusher 20
Union Iron Works breaker 21
Walburn and Swenson 23
Booth type 60
breaking point for 49
Brennan and Young 21, 59
Brinje type 58
Brodie type 60
Brown's 56, 58, 59
Buchanan type 59, 61
granulator 59
universal type 59
Camroux type 58, 61
capacity of 54
powers, etc. 56
Carterville Foundry & Machine Works Blake breaker 1201
Case laboratory breaker of the Denver Fire Clay Company 1204
champion type 58
classification of preliminary 1200
Codman type 58, 61
Cole type 59, 61
Comet 41
table of details of 41
comparison of 57
between different types of. A. B. Paul 2018
of jaw and spindle types 51
compound 57
cost of crushing by 49
running 54
Denver Engineering Works Company. Blake. 1203
Company. Blake. Table of sizes, capacities, power, speeds, weights, etc. 1204
different makes of 2009
Dodge type 28
double acting 60
Dragon type 58
duplex 21
Dyckhoff type 57
effect of corrugations on 52
essentials of 49
excelsior type 60
Farrel-Blake. Table of sizes, capacities, power, speeds, weights, etc. 1200
fine crushing by 54
Forster type 25, 57, 60
friction of 55
Fulton Iron Works 22
Gardiner type 57
Gates 36
action of 39
cast-iron head center for gyratory 1220
gunlock manganese-steel mantles for gyratory 1220
Gates Iron Works 23
style "K" 1207
table of sizes, capacities, power, speeds, weights, etc. 1208
table of details of 38
with short head and concaves 1208
table of sizes and capacities 1209

Breakers, general consideration about 47
Giant Rock 22
Griffith type 59
Gyratory, range of adjustment of 1218
Hall type 56, 57, 58
Hathaway, C. L. Gyratory 1215
table of sizes, capacities, power, speeds, weights, etc. 1217
Hercules rock, Hendy Machine Works 22
Hoagland 57
Hope type 61
Humboldt-Dodge type 1206
Engineering Company. Blake breakers 1205
in coal plant, requirements of 2009
jaw type 13, 25
general remarks on 33
Kennedy gyratory 1213
table of sizes, capacities, power, speeds, weights, etc. 1214
Krom, movement on in Mill 22 34
type 56
Krupp gyratory 1215
table of sizes, capacities, power, speeds, weights, etc. 1215
rock breaker 1202
wearing parts for jaw 1221
Lancaster 59, 60
large *versus* small 49
Lester type 56
life of wearing parts of Farrel-Blake at Mill 139 1221
McCully gyratory breaker at Mill 139 1222
Lowry national 45
type 58, 59, 60
McCully gyratory 44, 1210
at Mill 139 1213
manganese-steel, self-tightening mantle for. 1213
table of sizes of 44
table of sizes, capacities, power, speeds, weights, etc. 1212
Marsden fine breaker 56
type 56, 58, 60
Minnesota Iron mine 23
Monarch (Blake type) 20
Motte's type 58
movements of jaw 23
multiple jaw type 28
National Drill and Manufacturing Company's Blake breaker 1203
New Century Blake 1203
number used 51
Phelps type 59
power, cost, capacity, and weight 52
quality of crushing by 47
Risdon Iron Works 22
rock 13
Royal type 58
run by hydraulic power 60
Rutter 45
Samson breaker 1202
at Dives-Pelican mine, ... 1203
table of sizes, capacities, power, speeds, weights, etc. 1203
Schranz 31, 57, 60
sectional Krom's 21
section of Krom's standard 31
size and shape of mouth 54
of crushed product 1218
Monarch 21
speed, capacity, and power 53
spindle having largest movement on largest lump 1215
or gyratory type 36
table of comparative tests of 45
details of 46
Sturtevant-Dodge type breakers 1205
table of sizes, capacities, power, speeds weights, etc. 1205
roll jaw breaker 32, 1205
breaker 1205
Taft type 61
taper of 52
Taylor hand 59
tests of 59
Thomas type 57
Union Iron Works 21
water used 49
wearing parts for 48
wear of Dodge 31
Western Wheeled Scraper Company 25
Wolf's 56, 58

Breaking before stamping in California 1619
by hammers 9
with or without hand picking 9
cost of 50
at Mill 162 1222
crushing, comminuting 8
details of cost 51
for hand picking 1435
general considerations about 47
hand and machine compared 12, 56
pieces for breakers 2009
Breast water wheels 1090
Breccia, andesitic, crushed at Florence, Colorado ... 103
Breckenridge, Colorado, ore crushed in Griffin mill . 284
Breinigerberg mill, jigs in 597
mine, jig eccentrics at 532
Brennan and Young 1055
breaker 59
Blake type 21
Brewer, W. M. Log washer plant in Alabama ... 1180
settling in liquids 1183
spray pipe for trommel 385
Brewster, New York, mill at 1180
Briart bar screen 346, 384, 385
movable grizzly bars 386
Brick and stone for mills 1088
Bridgman, H. L. Bridgman mechanical samplers .. 884
sampler 2032
Bring, G. G. Action of sands in classifiers and jigs . 2020
investigations of suction in jigging 1461
study of jigs 1463
Brinje's breaker 58
Brink & Hübner disintegrator 236, 284
bibliography for 298
capacity of, at Mannheim 286
Brinsmade, R. B. Concentration in Southwest Missouri 2041
description of marble working machinery 2027
pyrite milling in New York 2037
the Combination Mountain mill, Montana 2042
mill of the North American Lead Company, Missouri 2042
Union mill, Gratz, Kentucky 2038
Briquetting iron concentrates 1054
ore 1057
Britannia Beach. Hancock jig at 1441
Copper Company, B. C., the mill of the, R. Stokes 2046
United mill, acid water 173
amalgamated plates in 745
amalgamation in 768
British Columbia, concentration at. R. Bell 2034
concentration in the Kootenay district. E. R. Woakes 2034
dredging in 1009
history of mining in. H. M. Lamb 2035
hydraulic minings in 2033
jigging five minerals in 591
milling at Roseberry. A. W. Dyer 2035
mills 2034
notes on. L. Jordan 2033
milling at the Slocan district. S. S. Fowler ... 2034
ore dressing in the Slocan district. P. Argall 2042
British imperial wire gauge 1195
Brittain, D. Milling the sheet ore at Joplin 2039
Brittleness of minerals, effect of 2
under crushing force 1611
use of made, in mills 891
Brodie breaker 60
Broken Hill, Collom jig at 515
concentration at. D. Clark 1568
at. T. J. Greenway 2040
concentration of lead ore at. V. F. S. Low. 2037, 2038
cost of producing lead and silver at 1964, 1965
DeBavay flotation process at 1562
Hancock jig at 504
jigs at 643
metallurgy at 1568
milling practice. G. Delprat 2038
R. Stokes 2046
milling practice 2039, 2047
mills at 1136, 1182
ore dressing at. G. D. Delprat 1923
Potter and Delprat flotation processes at 1561
Proprietary Company, report of the 2048
separation of galena-sphalerite ores at 1611
stamps at 227
steam stamps at 142
water used at 1104
Broken ore, weight of 1190
Bromilow magnetic separator 836, 2027
Bromine, atomic weight of 1188
Bromly, A. H. Weight of ore crushed for cyaniding. 1181
Bromyrite, specific gravity of 1189
Bronze for jig screens 545
screens 355
screens 174
Brooke, feeding Ball mills 1302
Brooke, H. J. Best size of feed for ball mill 1323
Brookfield Mining Co. 1166
Brookite, specific gravity of 1189
Brooklyn Chrome Steel Works 183
Broom for amalgamated plates 758, 760
buddles 705, 707
canvas tables 701, 702
German sweeping table 704
Brough, B. H. Concentration at Svärto, Sweden... 1185
magnetic concentration plants in Sweden 1179
Wenstrom separator and plant at Svärto, Sweden. 834
Broughton Asbestos Company magnet, the 1532
Brown & Sharpe 1195
gauge 1194
screen gauge 172
breaker 45
coal, specific gravity of 1189
F., Importance of fine grinding 1323
R. G. Details regarding Frenier sand pumps . 1587
plates and traps at Bodie, California 788
pumps for handling pulp 1610
stamps at Bodie, California 227
spindle breaker 56, 58, 59
Browne hydrometric conical sizer 409
sizing of products of 410
Brownell Frue vanner 2023
vanner belt 647
Browning crane hoist at Mill 165 1852
F. D. Plates in Providence mill 789
stamps at Providence mill, Nevada City, California 230
Brucite, specific gravity of 1189
Brückner ball mill 233, 260
bibliography for 293
Brunswick mill, wear of amalgamating pans 249
Brunton belt table 698
man elevator 2032
revolving furnace 1082
Brunton, D. W. concentration by free settling..... 475
principles of sampling 1575
rock house 485
roll shims 74
sampler 847, 1572, 2032
requisites to accuracy when using 1575
sampling 850, 884
Brush for dressing amalgamated plates..... 756, 760
Brussels carpet in sluices 1008, 1012
for tables 703
on tables 750
Bruyn slime separator 2020
Bryan mills at Mill 173 ..... 1879, 1928, 1929, 1930
bibliography for 295
data on. D. W. C. Nelson 2013
in Cananea for re-grinding..... 2016
number used 231
sizing tests on. F. P. Probert..... 1323
product 1310
pulp from 1317
tailings 273
versus high-speed rolls 1309
Huntington mill 273
rolls. F. P. Probert 1323
stamps 273
Bryan roller mill 234, 271
quartz mill, dimensions of 272
Bryant, W. G. Discussion of design of Blake breakers 1201
Buchal, L. Pointed boxes at Przibram 478
rope driver for stamps at Przibram 229
stamps at Przibram..... 229
Buchanan breaker 59, 61
at mills..... 1818, 1891, 1913
table of movements of old 23
C. G. Magnetic concentration 1178
granulator 59
magnetic separator..... 803, 2028
rock breaker 23
of Blake type 23
rolls 72
rolls at mills 1819, 1891
universal breaker 59
Buckbee, A., on silver milling 1040

Bucket conveyor 290
dredge 1008, 1011
elevators 862
sample 845
Buckets, elevator, materials for 864
for elevators 864
Buckeye engine 910, 920, 941
Bucking board 1137
King's 1285, 1323
samples 1578
Buckskin for squeezing amalgam 781
Buckstaves for gravity stamps 154
Bucyrus dredge 1011, 1653
close-connected type 1654
Buddle jig 518
Buddles 685, 704
bilbiography for 727
building 1464, 1507
convex Cornish, at Mill 185 1916
Dodd 1481
rectangular 706
round concave 706
convex 704
tye 707
Buffalo Hump Mining Co., mill 954
Tiger and Poorman Branch mill xxvi
Buffer for feeding gravity stamps 199
Bugbee, E. E. School laboratory work, a free milling gold ore 2048
Buhrstone mill 232, 252
bibliography for 291
versus Griffin mill 297
Building buddles 1464, 1507
tables 685, 704
Buildings, construction of 1088
for mills 1086, 1087
Bulkley condenser 1027
Builfrog cyanide mill. E. R. Ayres 2038
Bullion Beck and Champion Mining Company mill ..... xxvi, 926
Bullion contents of amalgam 783
fineness of 763, 785
Bull jigs at Mill 121 1685
Bumping ore feeder 854
tables 667, 1464, 1497
amalgamated plate on 740
Bartsch 691
compared 682
depth of bed 1510
details of in the mills 682
end-bump tables 680
Hendy concentrator 683
principle of 644
Bunker Hill and Sullivan mill 937, 1183, 1680, 2041
Mining and Concentrating Company mill xxvi
Burdon, J. A., Brunton belt concentrator 728
Burgan classifier, The A. L. 1371
Burke, Idaho, mill at 954
Burlap filter 879
for filtering dust 883
tables on dredges 1012
Burlingame, E. E., figures on sampling 852
rules for sampling 848
Burnett and Newbegin coal washer 2018
Burt, E., definition of slime 1397
fine grinding at El Oro 2013
milling at El Oro 2046
Burt filter presses at Mill 118 1678
Burthé, P. L. Gravity stamps 224
silver milling in the United States 1176
Varney pan 291
Buss patent Luhrig slimer 1496
slime table. E. Walker 2022
tables at Mill 185 1915
Butte and Boston Consolidated Mining Companies 1836
mill, cost of die, etc., at 121
Huntington mill in 281
Mining Company, mill ..... xxvi, 976
Reduction Works, test on ore at 674
Butte, Montana, concentration at. C. W. Goodale 2035
cost of milling at 1130
hammers used 10
improvements in concentration at. A. H. Wethey 2036
jig losses at 640
launders at 875
mills at 976, 978, 982, 987, 1119, 1175, 1176
ore dressing at. C. W. Goodale 1419
ores, concentration of. C. W. Goodale 2042
crushed by rolls 110
by steam stamps 135
Butte, Montana, ores, sizing tests on 180
Reduction Works 1849
mills ..... xxvii, 987
Willfley table at 674
Butters' and Mein pulp distributor at Mill 117 1670
distributors at Mill 106 1641
Butters centrifugal pumps at mills 1671, 1672, 1674, 1677
Butters, Chas. Coagulation, concentration, and settling of slimes 1184
cyaniding at El Oro 1924, 2040
figures on sampling 852
re-grinding tests on sands 2014
rules for sampling 849
valuable tube mill experiences in El Oro 2016
filter boxes at Mill 101 1627
pan, bibliography of 293
patent amalgamating pan 233
vacuum filter boxes at Mill 102 1630
Büttgenbach, P. Glass jig 1181
on testing jigs 1151
Büttgenbach's classifier 479
pointed boxes 478
hydraulic classifiers 476
separator (classifier) 447
Byron Jackson centrifugal pumps at Mill 103 ..... 1632, 1633, 1662, 1673

C

Cabarceno, Spain, mill at 1182
wash trommel at 330
Cactus mill, Newhouse, Utah 1924
L. A. Palmer 2041
Cadmium amalgan 730
atomic weight of 1188
specific gravity of 1189
Caesium, atomic weight of 1188
Caetani and Burt. Treatment of gold ores in dry districts 1419
Caetani, G. Comparison of stamps and Huntington mills 1262
definition of slime 1397
test of classifier jig at Mill 120 1452
Calamine mill 1739
specific gravity of 1189
Calcining for friability 9
Ammeberg, Sweden 9
in North Carolina 9
with or without quenching with water 9
for magnetism 1544
Calcite, angle of nip required to crush 94
decrepitation of 829
specific gravity of 1189
Calcium, atomic weight of 1188
chloride, a heavy solution for testing 1993
sulphate, removal of by heat 816
Calculation for pebble charge in tube mills, formula for. G. P. Scholl 2015
of classifier 401, 429
magnets 793
middlings into finished products 1164
settling tanks 454
Caldecott, W. A. and S. H. Pearce 1292
crushing efficiency of tube mills 1323
colloidal silicic acid in slimes 1619
costs of fine grinding 2015
definition of slimes 1398, 1399
discussion of fine grinding 2014
lime in settling slimes in South Africa 1178
tube milling grinding in South Africa 2014
use of lime in slime settling 1416
Caldwell, H. W. & Son Company. Drag or disc conveyors 1583
helicoid conveyor 1582
screw conveyor 1582
Caledonia mill 183
amalgam in 783
comparison of Gates' and Blake breakers in 54
details of screen in 170
dies used in 180
dimensions of mortars in 165
fineness of bullion in 785
loss in melting at 784
mortar 228
mouth 167
mortars 164, 165
rate of crushing in 165
running cost in 54
screen frame 177
weight of stamps and mortars 164

Calico, California, amalgamating pan at 290
California, chromite mill in 1074
concentration of auriferious sulphides in 2043
cost of gold milling in 1131
producing gold in 1977
dredging in 1009
gold milling in Nevada county. H. F. Brown.. 2043
gold mills in 1177, 1178, 1181
gold mills, modern practice in 1619
gravity stamps 138
milling practice at Hedges 2044
mill, number and height of drops in 214
mills in 1182
number of pulverizers in 231
silver mill, Nevada 1174
stamp mill 144, 2043
stamps 225, 230
in 226, 229
origin of 2012
versus Colorado and steam stamps 134
Colorado stamp mills 215, 220, 1030
suggestion for milling of gold ores. N. H. Storms 2034
system 224, 227
of stamp milling 1030
Caliper, Snyder micrometer 1362, 1366
Callon, J. Comparison of different crushing machines 315
Engis machine and Krom jig 837
Engis, Thirion, and Dorr hydraulic classifiers. Siphon separator 475
gravity stamps 223
hammers and breakers 55
jaw breaker 55
lectures on mining xix
mill schemes 1173
movable sieve hand and machine jigs, Harz jigs . 639
percussion tables, buddles, slime tables, and kieves 727
rolls and stamps 109
sieve scale, trommels 384
value of hand picking 492
Callow cones 1402
at mills 1632, 1660, 1687
computation for 1404
on Cœur d'Alene galena slimes 1404
test on Butte copper slimes 1404
J. M. Callow traveling belt screen 2018
flow sheet of mill using Callow machines ... 2020
pulp-thickening and settling tanks at Mill 114.. 1662
screens at mills... 1661, 1662, 1684, 1687, 1689 1725, 1726, 1738, 1760, 1794, 1795, 1833
capacity of to various meshes 1360
water in feed to 1360
settling tanks at mills 1689, 1711, 1712
slime and water cones 1367
sloughing-off tanks at mills 1662, 1687, 1689
system of ore concentration. J. M. Callow ... 2045
tanks 1420, 2020
at mills.. 1683, 1684, 1846, 1848, 1851, 1852, 1867, 1868
saving effected at Mill 163 1848
traveling belt screen 1358
J. M. Callow 2015
Calumet and Hecla, jigs at. (See also Mill 177.) 1440, 1446
mill 142, 990, 1184
Huntington mill in 281
Krause stamp 141
mortar housing lining for stamp 120
steam stamps 120
Mining Company 141, 1891
copper handbook 1925
mill xxvii
sizing tests in 259
sand wheel 867
type Chili mills at Mill 177..... 1893, 1894
classifier 391
at Mill 166 1855
Michigan, mill at 990
mill 1892
or Richards-Coggin classifier 1367
tables at Mill 177 1894
Cam and gravity for jig mechanism 506, 537
in Stutz jigs 537
and spring jig mechanism 507, 537
shaft for gravity stamps 190
Krupp 1272
spring and bumping post for tables 680
mechanism 667
stick 200
template 193
"Camel Brand" elevator belting at Mill 175 1889
Cameron pump 872, 898
Cammett table 676, 680, 2022, 2023
Campbell coal washing table. C. R. Claghorn..... 2023
washer 2023
Camp Bird mill 1623
Ouray, Colo. S. L. Goodale 2037
T. H. Woods, G. D. Doveton 2033
Camroux breaker 58, 61
Cams 191, 1272
Bally balanced 226
Blanton and other self-tightening 193
Boss cam key 1273
Canda cams for gravity stamps 1273
design of 196
for gravity stamps 191
friction and lubrication of 194
inscribing circles and clearances 196
lateral thrust of 195
right and left hand 195
self-tightening 193
stamp mill cam 2011
table of details of 192
Canada, chromite mill in 1074
Corundum Co., mill 1078, 1183
Cananea, concentration at. D. E. Woodbridge 1923
Consolidated Copper Company 1875
power tests at 1927
Sonora, Mexico, mill of the. O. P. Finley 2045
ore dressing at. D. E. Woodbridge 1419
type Blake breaker at Mill 151 1802
Canby dust separator at Mill 151 1803
R. C., separation of mixed sulphides 1923
Sutton-Steele dielectric separators 2027
process 1568
Canda cams 1273
at Mill 143..... 1769
stamp mill cam 2012
steel jaw-plates for Blake breakers at Mill 139 .. 1749
at Mill 166 1853
Canisteo district, Minnesota, washing iron ores in .. 1815
Cannon ball mills, number used 231
Cañon, Arizona, gasoline engines at..... 1091
Cantilever crane at Mill 171 for removing tailings .. 1870
Canton flannel tables on dredges 1012
Malleable Iron Company, iron balls for jig beds 1458
Canvas belt tables 698
belts 1094
conveyor belt, Leviathan 1585
elevator belt at Mill 125 1700
for squeezing amalgam..... 781
plant... 1017, 1021, 1029, 1035, 1037, 1038, 1101, 1110
at Garnet, Montana. P. S. Mussigbrod..... 2036
cost of 1126
failure of 1029
results at Mill 101..... 1628
test 1165
shield for stamps 177
surface for slime tables..... 695
sweeps for buddles..... 705, 706
tables 700, 1037, 1464, 1507
at mills..... 1696, 1755, 1779
bibliography for 729
details of, in mills..... 703
for testing 1155
new Dimmick patent slime table 1507
on dredges 1012
vanner belt 650
versus rubber for vanner belts 650
Capacities and speeds of picking tables and belts.... 1438
of Abbé tube mills at Mill 101 1626
air classifiers at Engis 818
Akron Chili mills, table of..... 1308
Allis-Chalmers rolls at Mill 179 1898
suspended frame vanners 1503
toothed and corrugated rolls, table of 1243
Alsing cylinders 267
amalgamating pans..... 243
American Process Company's driers..... 1598
Argall driers 881, 1600
arrastras 238, 239
Atwood amalgamators..... 776
Austin gyratory breakers, table of..... 1210
ball mills 261
at Mill 159 1828
Ball-Norton belt type separator at Mill 158 .. 1824
magnetic separators 1528
magnets 798
Bartlett picking tables..... 489
simplex concentrators 1487

Capacities of Bartsch rotary percussion table 1497
belt conveyors at mills...1667, 1670, 1681, 1690, 1691, 1707, 1708, 1709, 1771, 1772, 1828
percussion table 1496
Bilharz jigs 504, 518
tables 504
Blake breaker at mills....1618, 1621, 1742, 1749, 1769, 1792, 1802, 1853
breakers 17, 21, 24
Blake-Morscher electrical ore separator..... 1551
blanket concentrating tables at Mill 118..... 1677
blende jigs of Southwest Missouri..... 602
Bogardus mills..... 260
Boggs and Clark centrifugal pump at Mill 141 1761
boilers 1091
box classifiers 433
breakers 53, 56
at Mill 144 1771
in Caledonia mill 54
Brink and Hübner disintegrators 286
Browne hydrometric conical sizers 410
Browning crane hoist at Mill 165 1852
Bryan mills 272, 273
at Mill 173 1879
Buchanan magnetic separators 803
bucket conveyors 861
elevators..... 864
Bucyrus dredge 1654
buhrstone mills 253
Butters' centrifugal pump at mills 1671, 1672, 1674, 1678
Büttgenbach's separator 447
Byron Jackson centrifugal pumps at mills....1662, 1673
calcining furnace at Friedrichssegen 1546
Callow conical tanks at Mill 122 1687
screens at mills.....1661, 1662, 1687, 1795
to various sizes 1360
sloughing-off tanks at Mill 122 1687
Calumet and Hecla type Chili mills at Mill 177 1893
classifiers 401
canvas, blanket and carpet tables 703
tables 701, 702
at mills.....1627, 1779
Carr disintegrators 285
Castelnau belt tables..... 700
centrifugal pumps 869
at mills..1688, 1694, 1695, 1696, 1721, 1880, 1890, 1904, 1905
challenge feeders at Mill 174..... 1883
Chili mills 269, 270
at Mill 179 1898
chip screens at Mill 173 1879
clarifying reservoirs 460
tanks at Mill 138 .....1743, 1744
Clarkson-Stanfield centrifugal separators..... 820
classifiers.....403, 405, 432
at mills.....1878, 1879, 1880, 1902, 1903
clay washers 1076
Cleveland-Knowles magnetic separators 1542
cobbing magnets at Mill 164..... 1850
Comet breakers 41, 46
compound steam stamp at Mill 181..... 1906
cone mills 256
conical trommels at Mill 180..... 1902
Conkling jigs 503
convex buddles 705
conveying and picking belt at Mill 139..... 1749
conveying belts at various mills 1585
crushing machinery 2010
Cummings granulating mills 255
Cyclone beaters at Mill 186 .....1917, 1918
Cyclone dust settlers at Mill 105 1637
pulverizers 289
decrepitating furnaces 829
Dellvik-Gröndal magnetic separators..... 804
Denver Engineering Works Company's Blake breakers, table of..... 1204
dewatering wheel at mills ...1772, 1773, 1878, 1879
Dings magnetic separator..... 1541
at Mill 140 1759
distributor at Mill 126 1707
Dodd tables at Mill 96..... 1618
Dodge breakers 30
pulverizers 262
double cone classifiers..... 427
drag or disc conveyors 1584
dredges.....1007, 1008, 1011
driers 880, 882
drying floors *versus* mechanical driers 1596
Capacities of Edison driers.....882, 1600
magnetic separators 813
elevator at mills.....1661, 1663, 1667, 1685, 1690, 1707, 1727, 1728, 1729, 1749, 1750, 1752, 1753, 1755, 1771, 1772, 1774, 1829, 1842, 1843, 1844, 1845, 1846, 1847, 1853, 1854, 1877, 1880, 1898
Ellenbecker bumping tables 681
Elmore vacuum oil process 1558
Eureka rubbers 777
Evans classifiers 395
slime tables at Mill 177 1893
Farrel Blake breakers, table of 1200
Faust jigs 548
Ferraris ball mill 1300
belt tables 698
classifiers 401
patent tables, table of 1490
fixed screens 341
flotation vats at Mill 129 1718
Forsgen's electromagnetic separator 1539
Forster breakers..... 28
Frayer centrifugal pump at Mill 159..... 1829
Frenier spiral sand pump 871
Frisbee Lucop mills 267
Frue vanners at mills..1662, 1694, 1695, 1711, 1712, 1755, 1880
furnaces roasting for magnetism.....814, 815
Gates and McCully breakers..... 45
ball mills, table of 1301
Gates breaker on "choke crushing" 48
breakers 38, 46
at mills 1635, 1661, 1706, 1710, 1727, 1728, 1853
breaker with short head and concaves, table of 1209
style "K" breaker, table of 1208
Gebrüder Sulzer centrifugal pumps at Mill 118 1678
German sweeping tables 703
Geyer slime settlers..... 460
G. G. Gates classifier 418
Gilpin county bumping tables 681
Golden Gate tables 681
Gould centrifugal pump at Mill 139..... 1757
gravity stamps 148
Griffin centrifugal stamp mills 269
mills at Mill 105..... 1636
roller mill 284
Grill four-compartment driers 1596
grinding pans at Mill 105..... 1638
Gröndal magnetic separators 1537
Hadfield gyratory breakers at Mill 130 1719
Hallett table 676
Hancock jigs 505, 1441
at Mill 127 1710
on Montana copper ores..... 1442
hand jigs 499
Hardinge tube mills..... 1296
Harz jigs at mills 1772, 1773, 1774, 1775, 1877, 1878, 1879
Hathaway gyratory breakers, table of 1217
Heberli magnetic separators 799
mills 257, 259
wet magnetic separators 810
Heberwasche 520
Hendy concentrators 683
Hochstedt apparatus 817
Hodge and Cleaves sand pumps at Mill 182..1910, 1911
jigs at Mill 180.....1902, 1903, 1904, 1905
Hooper air jigs 822
vanning jigs 505
Huntington mills 280, 281
at mills..1669, 1686, 1687, 1694, 1701, 1711, 1753, 1869, 1897
with various screens 1314
Husband pneumatic stamps 141
Imperial screens, table of 1350
International magnetic separator 1535
James slimer 1492
Jeffrey swing hammer pulverizers, table of... 1322
jigs 507, 596, 597, 599
affecting number of sieves 589
at mills..1685, 1686, 1692, 1693, 1694, 1707, 1708, 1909
Johnston vanners 1502
at Mill 117..... 1669
Kennedy gyratory breakers, table of 1214
Kent roller mills..... 1304
King screens 1357
Knowles duplex vacuum pumps at Mill 117.. 1673
New Century magnetic separators, table of 1542
triplex pump at Mill 114 1674

Capacities of Krause pneumatic stamps 141
Krom air jigs 824
Krupp gyratory breakers, table of 1215
laboratory Wilfley tables 1991
Lake Superior hog trough classifiers 390
Langley's dry crushers 274
La Point flour gold separators, table of 1510
Latta and Martin pumps at Mill 144 1779
launders 875, 878
Linkenbach pointed boxes 412, 441
V-box classifiers 421
log washers 321, 324
Macquisten tubes 1565
magnetic separators at Monteponi 810
Przibram 812
Mathey roasting furnaces at Mill 148 1793
May Brothers' jigs at mills 1714, 1720
McCully breakers 44
at Mill 139 1749
diagram of 1212
gyratory breakers, table of 1212
Meinecke *spitzlutten* 425
men in cobbing 480
spalling 11
mill bins 842
mills ..... xxv, 1100
in reserve 1109
See Individual Mills in Chapter XX.
Monadnock Chili mills at Mill 144 1775
Morris centrifugal pump at Mill 139 1757
Mumford & Moodie dry separators 818
Narod pulverizers 282
Newaygo separators with various sizes of screens 1351
New Humboldt concentrator 1494
New Standard concentrator 1479
Nissen stamps at Mill 165 1264
Nordberg stamp at Mill 179 1897
steam stamps 997
steeple compound steam stamp at mills 1894, 1895, 1901
Overstrom tables at mills 1711, 1730
Oxland furnace at Mill 137 1549
Pape-Henneberg dry separators 820
Parsons & Fisher jigs 518
tables 669
Payne magnetic separators 800
Perserverance furnaces at Mill 105 1637
Phœnix atmospheric stamps 141
Pierce amalgamator 1517
Pilling air hoists, table of 1609
pulp thickeners at Mill 173 1880
pulverizers 232, 326
pumps 872
rectangular buddles 707
revolving knife buddles 329
Riblet aerial tramway at Mill 124 1696
Richards' annular classifiers 406
at Mill 127 1710
-Coggin classifiers 392, 393
at Mill 173 ..... 1878, 1879
hydraulic classifier at Mill 159 1829
pulsator classifier, table of 1390
jig, table of 1455
vortex classifiers at mills .. 1692, 1693, 1694, 1774, 1776, 1778
Richardson automatic scales at Mill 132 1727
rigid rolls at Mill 181 1906
Rittinger *Spitzkasten* 440
tables 668
roasting furnace at Mill 138 1747
Robins belt conveyors at mills 1636, 1750, 1876
conveying and picking belts at Mill 132 ... 1727
rock emery mills 255
rolls 64, 100, 1226
at mills .. 1667, 1686, 1714, 1727, 1743, 1749, 1750, 1751, 1771, 1773, 1774, 1792, 1793, 1829, 1854, 1877, 1879
diagram of 1228
rotary driers at Mill 186 1917
round tables at mills 1904, 1905, 1908
runs 448
Samson breakers, table of 1203
sand wheels 865, 866
at mills 1668, 1669, 1894
formula for 1586
Sautter magnetic separators 798
Schmidt spiral screens 363
Schranz jigs 503
mills 275, 276
Capacities of Scoby sampler at Mill 173 1880
scraping conveyor at Mill 114 1662
screw conveyors, table of 1583
settlers 778
settling tanks 455
shaking feeders at Mill 124 1691
grizzly at Mill 124 1690
screens 342, 345
Sherman re-grinders at Mill 132 ..... 1728, 1729
Siemens and Halske magnetic separators 799
separators 804
simple steam stamps at Mill 182 ..... 1909, 1912
slime tables 697
sluices 723
Spitzkasten at Mill 173 ..... 1878, 1879
stamps 174, 221, 1014
at mills .. 1620, 1621, 1624, 1632, 1640, 1661, 1668, 1677, 1769, 1915
in California 1619
increasing the 2012
on different size of feed 2012
steam hammer 12
steam stamps 126, 130, 133, 1004
on ore of Mill 48, table of 130
Stedman disintegrators 286
Stein, Bilharz, and Luhrig tables 670
Stroud mills, tables of 1320, 1321
Sturtevant, Dodge type, breakers, table of ... 1205
emery mill at Mill 186 1918
fan at Mill 105 1637
mills 288
roll jaw breakers 33
rotary breakers at Mill 186 1917
Sutton, Steele & Steele dry table 1555
pneumatic separators at Mill 151 1803
Tamarack classifiers 397, 398
Traylor centrifugal pumps 1588
at Mill 114 1662
jigs at Mill 169 1864
Trego roasting furnace 1548
Tremain steam stamp 138
trommels 359, 377
at mills .. 1681, 1682, 1690, 1691, 1692, 1693, 1742, 1743, 1749, 1750, 1751, 1752, 1771, 1772, 1773, 1774, 1876, 1877
trough washers 319
tube mills 1291
at mills 1632, 1770, 1922
Tustin's mill 262
Ullrich magnetic separator 1535
vanners 648, 658, 659, 662, 1110
and slime tables compared 691
at mills 1687, 1778
washing pans 333
wash trommels 330, 332
Wengler & Lowe's classifier 413
Wenstrom magnetic separator 801, 802
Wetherill magnetic separators .. 805, 807, 808, 1522, 1523
-Rowand magnetic separators at Mill 141 .. 1763
Whelpley & Storer pulverizer 289
Wild roller mills, table of 1304
Wilfley roasting furnace 1548
at Mill 140 1759
slimer 1505, 1506
table 674, 675, 1469
at mills .. 1633, 1661, 1662, 1669, 1687, 1694, 1695, 1715, 1729, 1744, 1745, 1776, 1777, 1829, 1830, 1880, 1894, 1904, 1908
Woodbury-Benedict jigs at Mill 177 .... 1892, 1893
Woodbury jig compared with that of Collom and Evans jigs 1448
tables 676, 1496
at Mill 117 1669
Worthington centrifugal pump at Mill 138 .. 1745
pump at Mill 175 1890
on the Rand, by addition of tube mills, increase of 2015
large increase of 2013
treated by Catermole process, or minerals separation process 1560, 1561
See also each machine.
Capacity, effect on cost 1127
Cape Colony, tin mining in. H. D. Griffiths 2035
Capel mine 905
Capelton, Canada, mill at 905
Capital Mining and Tunnel Company, mill of 1659
Caps in amalgamating pan 247
Captain Harris atmospheric discharge 583
John Richards discharge 580
Carat 1080

Carbon added to roast at Mill 137 ... 1549
atomic weight of ... 1188
effect of, in roasting for magnetism ... 1544
Carbonate mine, Paddock jig at ... 822
Carcanagues. Cornish buddles, frames, and kieves 728
tin dressing in Cornwall ... 1176
Card concentrator ... 1481, 2023
of jig work ... 632
vanners ... 657
tables at mills ... 1660, 1769, 1770, 1777, 1830
Care of belts ... 1093
journals ... 1097
mercury ... 785
mills ... 1114
Carey mill, bibliography for ... 292
pulverizing mill ... 232
Caribou rifle ... 1509
for black sands. F. Powell ... 2027
Carinthia, mill in ... 1185
Carkeek classifier ... 395
James, classifier ... 416
hydraulic classifier ... 416, 476, 477
jig beds ... 595
slope of launders ... 874, 875
Carlisle stamp mill ... 1180
Carnall wash trommel ... 334
Carn Dochan mill, dry concentration at ... 838
mine, dry separation at ... 820
Carpenter shop for mill ... 1087
Carpet tables ... 703, 750, 1035, 1464, 1507
Carr disintegrator ... 236, 284
bibliography for ... 298
table of details of ... 285
Carr, M., Carr disintegrator ... 298
T., Carr disintegrator for flour ... 298
Carrick, J. T. ... 1178
Carrier for conveyor belt, self-oiling ... 1585
Carroll, Montana, mill at ... 984
Carrying conveyors ... 1585
current in jigs ... 494
power of water current ... 477
Cars ... 843
for concentrates ... 1112
weighing of ... 1160
Carter auto-magnetic separator ... 2029
F. L., amalgam in the Transvaal ... 789
Carterville Foundry & Machine Works, The. Blake breaker ... 1201
life of wearing parts ... 1223
Casapalca, Peru, mill at ... 1180
Case laboratory breaker ... 1223
of the Denver Fire Clay Company ... 1204
Casings for elevators, etc. ... 1099
Cassiles Mine, Australia, milling at the. F. B. Stephens ... 2041
Cassiterite, hindered-settling test on ... 615, 617
settling velocity of ... 466, 469
specific gravity of ... 1189
Castelnau table ... 698
Cast gears ... 1096
Cast-iron head center for Gates gyratory breakers .. 1220
mortar blocks ... 148
specific gravity of ... 1189
Castor oil ... 1097
Cataract sand pump ... 868
Catermole flotation process ... 1555
the minerals separation process ... 1560
Catherine (Australia) mill, wear of shoes and dies in ... 183
Caucasus Copper Company, Limited ... 1860
mill ... 1860
Caustic potash, use of on amalgamating plates in California ... 1619
soda for settling slimes ... 1148
Cave Springs, Georgia, manganese ore from ... 809
Cazin, F., advantages of water over air ... 838
Cazin's jig ... 641
F. M. F., Cazin's circular jig ... 640
theory of settling ... 476
Cazin's circular jig ... 640
jig ... 641, 642, 643
Celestite, specific gravity of ... 1189
Cement for surface of slime tables ... 689
Gravel Drift Mining Company ... 211
gravel mill ... 1017
stamped ... 211
grinders ... 2016
grinding ... 2017
screening of ... 345
surface for slime tables ... 695
Cement surface on Linkenbach slime table ... 690
Center discharge for jigs ... 582
Centimeter, equivalents of ... 1187
Central City, screens ... 172
cone of amalgamating pans ... 241
Lead Company mill ... xxv, 917
Mill of North Star Mines Company ... 1617
the Twelve Apostles ... 1657
mine ... 1719, 1735
Centrifugal concentrator, Peck ... 828
dust collector ... 883
separator ... 828
force ... 1611
in drum magnets ... 798, 799
dry separation ... 818
Hendy concentrator ... 683
Huntington mill ... 278
Narod pulverizer ... 282
sand wheels ... 866
trommels ... 347, 350, 373
separation by ... 827
use made of in mills ... 890
hydro-extractor for oil process ... 832
machine for separating oil from concentrates in Elmore vacuum oil process ... 1558
pumps ... 868
at mills .. 1688, 1694, 1695, 1696, 1711, 1712, 1721, 1756, 1757, 1856, 1880, 1881, 1890, 1899, 1904, 1905
for hydraulicking ... 1006
sand and water, used for elevating mill pulp 870
rolls ... 74
Sturtevant ... 1237
Traylor ... 1588
sand distribution ... 1602
pumps ... 1588
separation ... 839
separator ... 827
a dry. T. Henrotte ... 2025
Clarkson-Stanfield ... 820
theory of separation on the. L. Kleritz 2020
versus plunger pumps ... 868
Centripact screens ... 1360
at Mill 169 ... 1865
Traylor ... 1352
Cerargyrite, concentration of ... 1016
specific gravity of ... 1189
Cerium, atomic weight of ... 1188
Cerro de Pasco, Chili mill at ... 295
Prieto mill, Sonora, Mexico ... 2042
Cerrusite, specific gravity of ... 1189
Chabazite, specific gravity of ... 1189
Chain and sprocket ... 1096
magnetic separator ... 811
Chainman mill, Ely, Nevada ... 2036
Chain plate conveyor, picking on ... 489
scraper for removal of jig tailings ... 588
Chalcocite, hindered-settling test on ... 617
settling velocity of ... 466, 469
specific gravity of ... 1189
Chalcopyrite, crushing by rolls ... 62
free settling velocity ... 471
separation from quartz ... 720
sizing test on ... 99
specific gravity of ... 1189
Chalk used in retorts ... 781
Challenge feed clutch ... 657
feeder ... 853, 1578
feeders at Mill 174 ... 1883
rock breaker ... 20
Chalmers and Williams Frue vanners ... 1499
at Mill 124 ... 1694, 1695
Huntington mills at Mill 171 ... 1869
Kennedy gyratory breaker ... 1213, 1223
power amalgam squeezer ... 1519
rolls at Mill 171 ... 1868
vanners at Mill 122 ... 1687
Chalmers, estimate of cost of hand picking on the Rand ... 487
J. A. and F. H. Hatch, gold stamp mills in So. Africa ... 1173
Chalon, P. F., crushing machines ... 316
stamps ... 227
Chamber mill ... 294
Chambers for dust ... 883
Chamois leather used on amalgamated plates ... 752
skin for dressing plates ... 759
squeezing amalgam ... 781
Champion breaker ... 58
Copper Company. Copper handbook ... 1925

Champion rolls mill 1900
stamp mill 1897
Chance, H. M., gold milling 1179
spiked rolls for coal 112
Change house 1102
of magnetism by heat 4
porosity by heat 4
Channeling for sampling 884
Channels in amalgamating pans 245, 246
Channing, J. Parke, graded crushing at Lake Superior 2018
Charcoal for melting 784
purifying mercury 785
Charge for amalgamating pan 243
Charleston, Arizona, feeding gravity stamps 208
Charleston mill 1174
stamps 224
Charleton, A. G., accounts and reports 1179
amalgamation 789
arrastra 290
breakers 60
breakers *versus* hand breaking 60
costs 1124, 1127
cost sheet forms ..... xix, 1173
dressing of nickel 1185
tin ore at Altenberg, Saxony 1173
gold stamp mills 1184
Huntington mill 297
labyrinth pointed boxes 476
methods of accounts 1182
milling for gold ores at Pestarena, Italy, and amalgamation at Francfort 1182
revolving tables 492
roasting for friability 56
rolls *versus* Sturtevant mill and stamps 111
Schranz mill 296
stamps in various parts of the world 229
Sturtevant mill 298
tin xix
mining 56
Charleton classifier 478
ore concentrator (classifier) 428
Chase, H. S., cost of milling 1135
Cranberry magnetic ores 833
magnetite in North Carolina 1176
Chase magnetic separator 832, 833, 835
Chatard, T. M. 1149
and Cabell Whitehead, settling of slimes at Republic gold mine, Washington 1176
on settling slimes 1148
Chateaugay iron ore concentrated by magnets 803
Ore & Iron Co., breakers at 59
mill 1175
ore separated by magnets 798
Chats 894, 900
Chaumeis and Simonnet, American gold stamp milling 1178
Cheese-scoop sampler 844
Chemicals for slime settling, relative values of 1414
use of 1413
in amalgamating pan 249
used on amalgamated plates 756
Chester, Massachusetts, mill at 1078, 1079
Chester Springs, Pennsylvania, graphite mill at 1075
Chicago & Aurora Smelting Co., speed of rolls and angle of nip 95
cost of mill at 1126
Iron Works rolls 76
Chihuahua, Mexico, concentration in. W. S. Hutchinson 2038
Dolores mill, the. J. B. Farish 2038
Granadena mill, the. J. T. Shaw 2039
milling practice at. T. H. Oxnam 2037
mining in western. W. S. Hutchinson 1923
Chili mill, development of the. C. C. Lane 2015
triple deck 2017
underdriven, an 2017
with two sets of rollers 2017
mills 234, 269, 1115, 1305, 2017
Akron 1280, 1307
as a re-grinder 1332, 1333
at mills .. 1767, 1775, 1833, 1859, 1865, 1873, 1886, 1893, 1894, 1898
bibliography for 295
Boss, M. P., on 1323
different methods of attaching rollers to 2014
Garfield 1280, 1305
Lane slow-speed mill 1308
Mantey offset for 1305
push feeder for 1581
Chili mills, table of sizes, capacities, speeds, weights, etc., of Akron Chili mills 1308
used in the clay industry, different forms of .. 2017
versus rolls for clay 2010
wet 2017
Chilled cast-iron for toothed rolls 1244
Chilled-iron balls for Harz jig bedding at Mill 183 . 1913
cost of, for Bryan mills 272
for amalgamating pan dies 245
wearing parts of rolls 1243
roll shells 68
shoes and dies 182, 183, 184
jaw plates at Mill 161, life of 1837
See Wearing Parts.
Chinese stamp mill 224
Chip screen at mills 1726, 1879
Chisel used in scraping plates 760
Chism, R. E., arrastra at San Dimas, Mexico 290
Chlorination, bibliography for 1173
cost of 1026
process at Mill 98 1622
rolls for 111
tests 1167
Chlorine, atomic weight of 1188
Choctaw Coal & Railway Co. 1180
Choice of crushing machines 313
process 1161
screens 174, 371
Choke crushing by breakers 48
rolls 98
feed for rolls. Comparison between free and choke feed 1229
to rolls at Mill 130 1720
Chondrodite, specific gravity of 1189
Christensen concentrator 1484
Chrome iron ore in Quebec, concentration of. W. H. Edwards 2038
ore in Quebec, concentration of. W. H. Edwards 2034
steel for breaker jaws 2010
jaw plates for Blake breakers at Mill 100 .. 1624
roll shells at Mill 158 1822
shoes and dies at Mills 1618, 1622, 1668
works 68
patent cams 194
Chromite concentrated by free settling 475
milling of 1073
mill, in Newfoundland 475
Newfoundland, sizing tests on 99
specific gravity of 1189
Chromium amalgam 730
atomic weight of 1188
specific gravity of 1189
Chrysoberyl, specific gravity of 1189
Chrysocolla, specific gravity of 1189
Chrysolite, specific gravity of 1189
Chuck blocks 177
Chuquicamata, Chile, separation by screening at 830
Church, J. A., amalgamating pans 291
pans at Tombstone 290
amalgamation of gold 788
mill at Tombstone 1175
Paddock's pneumatic jig 837
stamp and concentration mill at Tombstone, Arizona 1180
Chutes for hand picking 489
ore bins 843
in the mills 874
Cinnabar in California, concentration of 2044
ore dressing plant 1919
specific gravity of 1189
Circular jigs 518
movable sieve power jig 503
slime tables, operation of 692
Circulating cyanide solution, advantages of 1647
Cirkel, F., asbestos milling in Canada 2034, 2048
magnetic separation at Port Henry, N. Y. ... 2034
milling of asbestos 1568
mica 2025
City & Suburban mill, details of stamps 221
Clack on jigs at Mill 128 1714
Clamps for belts 1093
Clam shell dredge 1009
Clarifying reservoirs 460
tanks 1409
at mills 1642, 1743, 1744
Van Ryn gold mines estates 1410
Binkley settling system 1409
depth of discharge 1409
Merrill cylindrical clarifying tanks 1406

Clarifying tanks, Scobey system as used in Arizona . 1411
Tays' clarifying tank with skimming launder 1410
Clark, A. J., plate amalgam 788
silver plating copper plates at the Homestake mill 789
Clark, D. K., manual xix
for Mech. Eng. 1173
strength of stone 315
Clark, D., Potter and Delprat processes *vs.* magnetic separation 1568
Clark, Ellis, Jr., Blake breaker at Przibram 57
dressing works at Przibram 1174
gravity stamps 224
hand picking and picking tables at the Anna and Adalbert works, Przibram 492
Harz jigs at Przibram 640
magnetic separator at Przibram 833
on length and number of strokes in jigs 594
on power in jigs Przibram 603
pointed boxes and Rittinger *spitzlutte* at Przibram 476
Rittinger and Salzburg tables at Przibram ... 728
roasting for magnetism 815
stroke of jigs 594
trommels at Przibram, Bohemia 385
table 689
tube mill 2014, 2016
Clarkson sampler 884
Thomas, Clarkson sampler 884
Clarkson-Stanfield centrifugal separator 820, 828
dry separator 890, 891
Classification by free settling 475
of breakers 13
classifiers 1370
conveyors 1582
crushing machines 316
driers 1595
feed for slime tables 720
finely crushed ores. J. M. Callow 1420
fine sand and slime concentrators 1464
grinders 1279
jigs 551
magnetic separators 796, 1521
preliminary breakers 1200
washers 1341
pulp thickeners 1401
pulverizers 231
revolving screens 1353
riddles 1346
rolls 62
screens 1345
slime table feed 693
stamps 113, 1246
tube mills 1285
vanners 645, 1498
Wilfley table group 1465
Classified feed for Wilfley table 1473
products, proper treatment of 1478
used for film sizing tests 707
versus sized feeds for the Wilfley table 1478
Classifier jigs 1447
at mills 1447, 1452
new laboratory. H. S. Munroe 2020
spigots 388
diameter of 404
Classifiers 387, 1367
adjustment of 430
Altenberg 416, 475
Anaconda 395, 1367
hydraulic, details of in mills 396
article on 2020
ascending-current cones or cylinders 1402
at Ammeberg 1121
Engis using air 817
mills 1878, 1879, 1880, 1902, 1903
Vaucron mill 416
before vanners 658
Berenger and Stingls slime tank 1407
bibliography for 475
Bilharz 475
spitzlutte 423
Boss cone 425
box 432
Browne hydrometric conical 409
Büttgenbach's separator 447
calculation of 401
Callow cone 1402
slime and water cones 1367
Calumet 391
or Richards-Coggin 1367
Classifiers, Charleton ore concentrator 428
classification of 1370
Colorado Iron Works Company slime tanks .. 1407
computation of 429
Richards' pocket vortex classifier 1374
cone 410
constant head of water for 387
Dalton 398
deep double trough 416
deep-pocket classifier 1371
free-settling classifiers 1371
hydraulic 409
definition 387
of sorting column 387
De Kalb's perforated board classifier 1402
design of 1432
Dimmick 1417, 1420
distributing tanks 449
Dodge sizing box 416
Dorr. J. V. N. Dorr 1344
mechanical 1343
double cone 426
Dow 475, 476, 477
Engis 475, 477
Evans 393, 1367
extent of classification 1433
feed for 389
sole for 434
Ferraris 400
for coal 476, 479
jig tailings 587
steam stamp 1003
testing 1144
Fraser & Chalmers 416
gates and dams 406
G. G. Gates segregator 418
gooseneck spigot 388
heberwasche 421
helical current in 401
hog-trough 1367
hopper bottom 412, 413, 414, 415, 416
hopper-shaped shallow pocket 400
Huet & Geylers 478
Hundt's 478
hydraulic 387
Burgan, A. L. 1371
deep-pocket hindered-settling 1387
difficulties attending classification 1368
direct pulsator classifier 1391
double-cone hydraulic classifier 1381
Evans 1369
Ferraris 1369
Fraser and Chalmers 416
Gates classifier 1369
hindered-settling, improved Wolf-Tongue 1387
history of 1367
Krupp *Spitzlutten* 1382
limitations of 1368
Longdale, at Mill 155 1369
means for overcoming adverse tendencies ... 1369
Merrill small cone classifiers 1371
New Standard 1369, 1373
principle of action of 387
Richards' annular vortex classifier 1382
pocket vortex classifier 1373
pulsator classifier 1388
shallow-pocket hindered-settling classifier .. 1384
undercurrent 1386
vortex, at Mill 124 ..... 1692, 1693, 1694
single-spigot vortex classifier 1377
sizes of feed to 389
sorting column in 387
spigots in 388
Swain classifier 1371
table of sizes, capacities, etc., of Richards' pulsator classifier 1390
tank vortex classifier 1379
trough or shallow-pocket 389
tubular free-settling classifiers 1381
Wengler classifier 1367
Wolf-Tongue classifier 1369
imperfections of deep-pocket form 409
inclined one-current 1146
in stamp mills 658
investigation of currents 434
James Carkeek 416
kinds of 387
labyrinths and runs 447
Lake Superior hog-trough 390
products of in Mill 45 391

Classifiers, Lake Superior, hog trough, products of in Mill 46 ... 391
launders for ... 440
Linkenbach pointed boxes ... 412, 416
V-box ... 421
Lockhart's automatic gem separator ... 430
tubular ... 476
Meinecke ... 430
spitzlutte ... 425
Merrill cylindrical clarifying tank ... 1406
hydraulic classifiers ... 1367
large cones ... 1406
at Mill 106 ... 1640
small cone at Mill 106 ... 1641
New Standard ... 1419
perforated board in ... 437
pointed box, in the mills ... 442
position of ... 1108
principles of action ... 387, 1368
products, sizing tests on ... 1141, 1144
purpose and essentials of ... 389
purposes of ... 1367
quality of work of ... 461
Ramsey sludge tank ... 446
results of ... 405
Richards' annular vortex ... 406
-Coggin or Calumet ... 391
pulsator ... 1419
shallow-pocket ... 401
tubular ... 428
Rittinger pointed boxes ... 411
Robinson coal washer ... 478
Schöne tubular ... 476
screen for ... 433, 443
settling tanks ... 450
Sherman system of settling tanks ... 1404
sizing tests on ... 406
slope of sides ... 440
spigots for ... 433
spitzlutte ... 421
strainer for ... 388
suited for testing ... 1989
surface-current box ... 433, 1401
in the mills ... 441
Swain ... 1420
Tamarack ... 397
testing of ... 1170
Thirion ... 475
trough or shallow-pocket ... 389
tubular ... 421
classifier, *spitzlutte* ... 1371
for hindered-settling tests ... 611
investigating free settling ... 469
unwatering boxes ... 450
used for mercury trap ... 774
use of hydraulic water ... 433
U-shaped iron pipe ... 424
V-box design ... 419
in the mills ... 442
versus screens ... 368
vortex ... 403
water. See Water.
Wengler & Lowe's ... 413
whole-current box ... 443, 1402
Wunderlich coal washer ... 477
Yeatman ... 399
Classifying by free settling in water, bibliography for ... 475
laws of ... 464
Claudet, A. C. ... 1182
gold stamp mills at Mesquital, Mexico ... 1182
Clausthal, Germany, breaker at ... 57
central ore dressing plant at ... 2039
classifiers at ... 476, 477
concentrating plant ... 1795
details of stamps at ... 223
finest size jigged at ... 606
hand picking at ... 492
improvements at ... 1924
jig discharge at ... 582
feeder at ... 549
mechanism at ... 530
spigot at ... 528
jigs at ... 640, 643
versus tables at ... 606
life of screens at ... 354
mill at ..965, 1086, 1102, 1116, 1121, 1174, 1177, 1186
sieve scale at ... 367
picking at ... 487
plunger rods of jigs at ... 531
Clausthal, power at ... 1089
pointed boxes used at ... 476, 477
removal of slimes by classifiers at ... 373
rolls at ... 109
screening at ... 373
sieve scale at ... 367
sizes of ore hand picked at ... 487
slope of jig sieves at ... 548
stamps at ... 225, 230
stroke of jigs at ... 594
trommels at ... 385
truing rolls at ... 110
unwatering sieve at ... 586
Clay and kaolin washing, capacity of Stedman disintegrator for ... 286
crucibles for melting ... 784
crushed in rolls ... 112
crushing machine for ... 2017
description of a breaker used for ... 2010
effect on mercury ... 751
elimination of ... 895, 897
ground by edge runner mills ... 270
moved by water ... 878
preparation of. G. Benfey ... 2026
quartz, weight of ... 1190
removal of impurities from. F. Lehman ... 2026
settling of ... 1149
rate of ... 474
used in retorts ... 781
washing ... 333, 1075, 1173, 1178, 1183, 1185, 1186
C. F. Binns ... 2025
Dümmler ... 2030
H. Ries ... 2028
J. W. Schamberger ... 2030
in Ohio. A. M. Fish ... 2026
weight of ... 1190
Clayey ores on vanners ... 660
Clayton, J. E., on amalgamated plates ... 743
Cleaned-ore plane ... 1465
Cleaner jigs at Mill 148 ... 1793
Cleaning amalgam ... 780
amalgamating plates ... 756, 757
at Mill 100 ... 1624
Mill 101 ... 1626
in California ... 1619
jig ... 894
concentrates ... 587
screens at Mill 148 ... 1792
sieve ... 576
machines for concentrates ... 320
method for rolls ... 2011
of copper plate before amalgamating ... 752
plane, definition of ... 1465
on vanners ... 646
up dredge products ... 1013
mercury traps ... 774
sands from roller mills. H. S. Kenney ... 2017
Clean-up apparatus ... 1020
barrel ... 234, 264
at Mill 111 ... 1656
bibliography for ... 294
for testing ... 1156
details of, in mills ... 265
devices ... 1519
of gravity stamps ... 201
mercury traps ... 774
riffles ... 725
stamps in mechanical batea ... 683
steam stamps ... 134
pans ... 232, 250
and barrels ... 202
bibliography for ... 291
tables of details of in mills ... 252
room ... 266
trolley for a gold mill ... 2031
See Individual Gold Mills in Chapter XX.
Clearance in steam stamp cylinder ... 123
of gravity stamps ... 195
jig plunger ... 529, 530
Cleats, cast rubber riffle cleats for Bartlett Simplex concentrators ... 1487
copper riffle cleats for concentrating tables ... 1481
for Deister concentrators ... 1488
Overstrom tables ... 1486
height of riffle cleats for Wilfley table ... 1468
riffle for Wilfley tables ... 1467
"tacking on" *versus* "grooving" ... 1498
Cleavage, effect of in minerals ... 3
Clemens Jones ... 1135
Clerc, G., history of stamps ... 225

Clerc, G., methods of jigging 641
separation 1177
Cleveland-Knowles magnetic separator 1542
at Mill 148 ..... 1792, 1793
Clifford, H. E. viii
Clinochlore, specific gravity of 1189
Clinometer 1159
Clinton fossil ores treated on Wetherill magnetic separator 808
Clitters mines, treatment at the 1924, 2041
Clogging of screens 373
Close sizing for jigging 606
Cloth for dust prevention 1099
screens 170
compared with punched plate 171
details of from the mills 170
Clunes, amalgamation at 788
double discharge at 209
mercury wells at 768
shoes and dies at 183
stamps at 226
Victoria, mills at 1180
Clutches for gravity stamps 198
friction 1096, 1606
Coagulation of fine slimes 1147
Coahiula coal washer 2051
Coal. See also Fuel.
as fuel in Wilfley roasting furnace 1548
breaker, a new. W. S. Ayres 2049
at Alden, Pennsylvania. M. S. Hochita 2051
Bankhead, Alberta. L. Stockett and B. R. Warden 2050
Stockett, Montana. L. Stockett 2049
briquetting system 2050
burned in mills. See Individual Mills in Chapter XX.
roasting for magnetism 815
capacity for, of Stedman disintegrator 286
centrifugal machine for 820
classifier 479
combined disintegrator and screen for. M. A. Sattiaux 2018
consumed in roasting for magnetism 814
consumption in driers 880, 882
crushing of 284
dressing, changes in anthracite 2052
jigs. R. A. Henry 2051
dust, air blast for 839
removal of 2050
removed by air blast 837
from 817
handling machinery for 2051
C. Piez 2052
in Pennsylvania, breaking of anthracite 2051
jigs ..520, 523, 548, 549, 574, 588, 639, 640, 641, 642
magnetic treatment of. E. Post 2052
method of separating dust from 2050
mine to develop electric power 1092
mining in India, cheap. H. M. Cadell 2050
picking in Cainsdorf 2051
preparation machinery. R. V. Morris 2050
Ramsey sludge tank for 446
required per horse-power hour at Mill 172 1874
screening 365
and washing of. T. H. Aldrich 2052
by the by-pass system 2050
of 345
S. A. Everett 2050
papers on 2018
plant of the Clifton colliery, a new 2051
3000 tons capacity 2052
screens for 342
separation of dust from. A. Wiedl 2051
slate pickers for 489, 492, 493
-testing device. Delameter 1993
used in roasting for magnetism 815
washeries, anthracite. G. W. Harris 2049, 2050
different 2050
Pennsylvania, bituminous. W. G. Wilkins ... 2051
washery at St. Beram. M. Benotte 2050
washing 1106, 1178
advances made in 2050
an article on. S. Diescher, Sr. 2051
and screening. T. H. Aldridge 2049
at Saint Eloy colliery 2050
the Baüm colliery 2050
Cadeby colliery 2050
Reynolds culm bank. A. D. W. Smith .. 2050
bibliography. S. S. Wyer 2049
bituminous. G. R. Delamater 2051
Coal washing, discussion of. H. L. Siordet 2051
improvements in 2050
in a Belgium colliery 2050
Alabama. E. Ramsay, C. E. Bowron 2050
W. B. Phillips 2049, 2050
W. R. Crane 2051
America. G. W. Harris 2050
Belgium. E. Discry 2052
Colorado, anthracite. R. M. Hosea 2050
bituminous 2051
England. M. Baldauf 2052
France 2050
results of 2050
Indiana. G. H. Ashley 2051
New South Wales 2050, 2052
machines, control of. P. Charvet 2052
plant, at the St. Louis Exposition. J. D. Wick 2052
description of a. D. F. Cameron 2051
preliminary investigation of. L. A. Harding 2051
principles of 2050
results of 2050
some references to 2051
Coarse concentrates on jigs, defined 494
removal of in jigs 576
concentration without sizing. S. W. Taylor ... 2043
limit of screening 368
mine ore, treatment of 1111
Coarsest size treated by jigs 605
Coates tubes at Mill 149 1795
Macquisten's flotation process 1563
Cobalt amalgam 730
atomic weight of 1188
concentration at 2034
specific gravity of 1189
Cobaltite, specific gravity of 1189
Cobbing 480
at Mill 186 1916
devices 1439
for asbestos 1079
hammers 11, 55, 56
at Mill 186 1917
houses 492
magnets 1531
at Mill 138 ..... 1742, 1806, 1807, 1818
Bilharz 1532
Broughton Asbestos Company magnet 1532
Cranberry 1530
Eastwood 1532
Manhattan Asbestos Company magnet 1531
(Wethey) at Mill 164 ..... 1849, 1850
plant at Mill 158 1821
Cocheño, settling tank at 459
Cochiti mill 1092
Cochiti, New Mexico, gold mining at, W. C. Wynkoop. 2036
Cocoa matting for tables 702
on dredges 722, 1007, 1008, 1012
tables at Mill 111 1655
efficiency of 1657
Codman breaker 58, 61
Cœur d'Alene district, Idaho, concentration in the. A. Locke 2041
cost of producing lead and silver in 1960, 1961, 1962, 1963, 1964
hammers used 10
mill in 1183
milling at 2045
milling practice in the. J. R. Finlay 2037
mining. J. R. Finlay 1922
Coffee mill 255
Coggin, F. G., Ball and Leavitt stamps 142
Evans and Linkenbach slime tables 728
on area of discharge of steam stamps 129
efficiency of steam stamps 133, 134
power for steam stamps 131
slime tables 697
steam stamps 142
Cohesion of mercury, effect of temperature 767
Cohn's ball mill 293
Coignet, F., amalgamation 788
M. F., California stamp battery 225
Coils for heating 1098
Coke breaker, a new. G. Kroupa 2010
used in roasting for magnetism 815
Cole, David, power tests by 1927
shovel-wheel at Mill 124 1693
Cole's breaker 59, 61
Collar for cam shafts 190
grit 1098
Collectors for amalgamated plates 743
Collett, water softening 1419

Collins, A. L., amalgam ... 789
cause of hard amalgam ... 2024
H. F., Clarkson sampler ... 884
metallurgy of lead and silver ... xix
J. H., definition of slimes ... 1397, 1419
Colloids, effect of heat on ... 1414
Collom, Evans, and Woodbury jigs, capacities compared ... 1448
jig ... 510, 1440, 1446
advantages of ... 514
construction of ... 524, 525
height of tailboard ... 551
hydraulic water in ... 537
life of ... 604
mechanism on grizzly ... 345
modifications of ... 515
size of sieve and plunger ... 529
slope of sieves in ... 548
speed of ... 593
sampler ... 847
versus Harz jig ... 515
Colombia, S. America, milling in. Juan de la C. Posada ... 2039
quartz milling in. F. F. Sharpless ... 2038
Colorado, concentration of zinc ores in ... 2043
concentrator, cost of crushing by rolls ... 104
cost of milling in ... 1129, 1133
producing gold in ... 1974, 1975
lead and silver in ... 1965
tungsten mining and milling in ... 1987
dredging in ... 1009
general milling practice in Gilpin County ... 2045
Iron Works ... 1407
Akens and Evans slimer ... 1500
Blake breaker ... 23
breakers at Mill 144 ... 1771
Challenge-type feeder ... 1580
continuous grinding pans ... 1323
Dodge breaker ... 31
double-cone hydraulic classifier ... 1381
grinding pan, continuous ... 1282
Humphrey rolls ... 1244
impact screen ... 1351
at Mill 151 ... 1803
octagonal trommel ... 1360
on rolls ... 71
Perfect ore feeder ... 1609
power for rolls ... 97
rolls ... 76, 84
at mills ... 1690, 1691, 1749
roll speeds ... 87
roll springs ... 74
single cone classifier of ... 477
slime tanks ... 1407
and classifiers ... 1419
vanner ... 652
jig connecting rod in ... 530
mill in ... 1120
milling in ... 1177
mill, number and height of drop of stamps ... 214
practice in different camps ... 2043
present milling practice in. H. C. Parmalee ... 2035
Smelting and Mining Company ... 1836
mill ... xxvi, 978
Huntington mill in ... 281
stamps *versus* California and steam ... 134
system of stamp milling ... 224, 227
versus California stamp mills ... 213, 224, 1030
Zinc Company ... 1758
Color affecting separation ... 889
and luster of minerals, effect of ... 3
of minerals in artificial light ... 481
Columbia mill, Browne hydrometric sizer in ... 410
vanners in ... 658
Columbian mines, amalgamated plates at ... 749
pulsating screen ... 343
separator, Jeffrey ... 2018
Columbite, specific gravity of ... 1189
Columbium, atomic weight of ... 1188
Combination cone and horizontal ball mill ... 2017
crushing, amalgamating, and cyanide machine. M. Dekeyser ... 2033
mill, Goldfield, Nevada, treatment at the. F. L. Bosqui ... 2045
M. R. Lamb ... 2038
Granite County, Montana. R. B. Brinsmade ... 2042
of the Goldfield Consolidated Mines Company ... 1626
mills ... 1039, 1046, 1060, 1101
Combination of principles of separation ... 891, 1611
pan ... 239
process of amalgamation ... 248
silver mills ... 1103
Comet breaker ... 41, 57–60, 2009
adjustment for wear ... 43
amount of throw ... 43
table of details of ... 41
dimensions of ... 44
Commans, R. E., breakers ... 60
buddles, percussion tables, vanners, slime tables ... 729
capacity of jigs ... 597
Clarkson-Stanfield, Mumford & Moodie, Pape-Henneberg separator ... 838
grizzlies, riddles, and trommels ... 385
hand picking and picking tables ... 492
jigs ... 643
Richards-Coggin classifier, Büttgenbach's pointed boxes, Bilharz, Rittinger, *spitzlutte* Osterspey siphon separator used at Mechernich ... 478
Schranz breaker ... 60
separation ... 1182
separators ... 835
slope of jig sieves ... 548
stroke of jigs ... 594
Commercial limit of concentration ... 1118
Comminuting ... 8
Commonwealth mill, Pearce, Arizona, milling at the Mining and Milling Co., ball mill ... 2044, 261
Compañia de Huanchaca de Bolivia, stamp frames Minera del Tiro General ... 160, 1802
Comparative sizing test of tailings and concentrates from stamps and Lane Chili mill ... 1309
tests of spindle and jaw-breakers ... 53
table of ... 45
wear of metals for jaw plates of Blake breakers ... 48
work of gravity stamps and Huntington mills ... 1262
Comparison between single-cylinder and compound steam stamps ... 1254
of Blake and Dodge type of breakers ... 33
California and Colorado systems of stamp milling ... 1030
canvas and rubber vanner belts ... 650
capacities of Woodbury, Evans, and Collom jigs ... 1448
concentration and amalgamation ... 1047
convex and concave buddles ... 706
slime tables ... 692
crushing machines ... 313
flat and sloping mill sites ... 1085
Gates and McCully breakers ... 45
geared and belted rolls ... 83
Harz and Collom jigs ... 515
jaw and spindle breakers ... 51
jigs and tables ... 606
large and small breakers ... 49
materials for jig screens ... 545
wearing parts for breakers ... 48
methods of running jigs ... 571, 572
mine and mill work ... 1123
picking tables ... 491
plain copper and silver plated plates ... 748
pulverizers ... 231
punched plate and wire cloth ... 354
riffle tables ... 679
Rittinger and Wilfley tables ... 679
rolls and Sturtevant mills ... 110
round hole and slotted screens ... 169
sampling methods ... 848
screens ... 175, 345, 369
side-bump and end-bump tables ... 682
side-shake and end-shake vanners ... 655
single and double discharge for stamps ... 209
smooth and corrugated vanner belts ... 650
spindle breakers ... 46
steam and gravity stamps ... 134
trommels ... 362, 377, 378, 379
and riddles ... 365
Utah Copper and Boston Consolidated mills ... 2012
vanners with convex slime tables ... 691
water used by Evans and Hancock jigs ... 1442
wire and plate screens ... 171
Compensating weights for gravity stamp at mills ... 1645, 1651, 1668
Complex jigging mills at Lake Superior ... 990
in Colorado and Utah ... 925
Idaho and Europe ... 936
Montana ... 973

Complex jigging mills in southeastern Missouri 916
for blende or pyrite 906
Compound and single cylinder steam stamps, comparison between 1254
breaker 57
edgestone mill 235
bibliography for 296
engines 1091
steam stamp at Mill 181 1906
Compressed air for pumps 1106
jig 519
Compressive strength of stone 300
Computation of Callow cone 1404
classifier 401, 429
grain sizes for free-settling tests 465
Richards' annular vortex classifier, for coarse grains 1382
fine grains 1383
pocket vortex classifiers 1374
single-spigot vortex classifier 1377
tank vortex classifier 1380
work for crushing 312
Computed horse-power for trommels 357
Computing tests 1161
Comstock, amalgamating pans at 291
lode, Nevada, mills on 1175, 1184
mills, wear of amalgamating pans 249
stamp mills 230
Concave buddle 706
slime tables 692
versus convex slime tables 692
Concaves and short head, Gates breaker with 1208
for spindle breakers 47
Concentrate drying bins 1570
at mills 1570, 1669
Concentrated, list of ores that can be 2049
Concentrates bins 843
cleaned by trunking machine 321
cleaning of 320
coarse, definition of 494
drying of 880
moisture in 1107
of jigs, removal of 586
percentage of, affecting capacity of jigs 601
purity affecting extraction 1118
sampling of 845
sizes of, in mills 1116
storing and shipping 1112
tank for vanners 647
Concentrating plane on vanners 646
slope of in vanners 659
Concentration. See also Milling and Ore Dressing.
advances in the art of. F. Cirkel 2048
amount of 1118
by free settling 475
compared with smelting 1
followed by lixiviation 1616, 1665
history of. A. W. Warwick 2049
limit of 1118
magnetic 790, 1521
mill 1117
molybdenite dressing 1567
of copper ore. F. H. Probert 1997
galena ore. F. H. Mason 2046
pneumatic 815
progress in. V. Horel 2049
of 2049
ratio of. See Individual Mills in Chapter XX.
relation of physical properties of minerals to 2
separation by crushing and screening 1566
decrepitation and screening 1565
tendencies in 2048
versus amalgamation 1047
wet. C. Taylor 2043
works at Monteponi, Sardinia 1066
Concentrators, air, using a continuous blast of air 816
using force other than air blast 818
amalgam traps for 1516
Bartlett Simplex 1487
Bartsch rotary percussion table 1497
belt percussion table 1496
Card 1481
Charleton ore 427
Christensen 1484
Deister 1488
depth of bed in 644, 1510
different types 2022
electrostatic separators 1549
Ellis 657
Embrey 653
Concentrators, Ferraris table 1490
fine sand and slime 644
for fine sands and slimes, belt film-tables 697
bumping tables 667
film-sizing tables 685
intermittent surface tables 700
kieves 726
riffles 720
general comments on rectilinear tables 1498
Gilpin County 680
Golden Gate 681
Hendy 683
Hooper pneumatic 820
James slimer 1491
table 1490
Johnston 652
Luhrig-Buss table 1492
Luhrig slimer 1496
magnetic separators 1521
McLeod 1492
New Humboldt 1493
New Standard 1478
Norbom 652
Pinder 1479
pneumatic belt 818
slimers 1504
Triumph 652
Tulloch 652
vanners 1498
Wilfley group 1465
table 1465
Woodbury table 1494
Concentric conical trommels at mills 1818, 1854
cylindrical trommels at mills 1655, 1793
grinders 313
trommels 362
at Mill 154 ..... 1815, 1816
Concheño mill 1665
Concrete bins at mills 1756, 1834, 1858
foundation for mills 1088
mine, stamping of ore from 220
mortar blocks 148
C. D. Kaeding 2013
settling tanks at Mill 171 1870
stamp mill foundations. G. P. Scholl 2011
Condensation of steam 1091
Condenser for retorts 781
Conductors for electrostatic separation, list of good and poor 1550
Cone classifier 410, 426, 476
for amalgamating pan 241
mill 232, 255, 2017
bibliography for 292
pulleys for Bradford jig 501
jigs 533
sampler 846
settlers at Mill 166 1855
Cones, pyramids and prisms 361
Conglomerate ore, mills for 990
weight of 1191
Coniagas mill, Cobalt, Ontario. R. Stokes 2046
mines, Limited 1679
Conical trommels 361
at mills .. 1714, 1783, 1784, 1785, 1815, 1854, 1898, 1902
tube mill, Hardinge 1296
Coning and quartering in sampling 1577
sampling by 844
Conkling dry magnetic separator 809, 810
jig 503
movable sieve jig 640
Connecting rods for jigs 530
Conrey Placer Mining Co 2036
Consistency of pulp for Wilfley table work and vanners 1848
vanner feed at Mill 173 1878
Wilfley table feed at Mill 173 1878
Consolidated Main Reef, sand wheel at 1587
Stanley mill, Cammett table at 677
Virginia mill, cross sills in 153
mud sills in 153
Constant speed for machines 1092
Construction and operation of stamp mills. R. M. Aitken 2048
expenses 1123
method at Mill 174 1887
of jigs 524
mill buildings 1088
rolls 63
slime tables 684

Construction of stamp mills. J. J. Deming..... 2049
J. Roskelly..... 2048
trommels..... 350
on the Rand, mill..... 2049
Consumption of cast-iron per ton rock crushed at Mill 180..... 1902
coal in American Process Company's driers ... 1599
Argall drier..... 1600
Edison drier..... 1600
per horse-power in gas system at Mill 172 .. 1874
fuel in Wilfley roasting furnace..... 1548
oil in Elmore vacuum oil process..... 1560
pebbles by Abbé tube mills at Mill 101..... 1626
Krupp tube mills at Mill 118..... 1677
tube mills at Mill 103..... 1632
steel by Bryan mills at Mill 173..... 1879
rolls at Mill 173..... 1877
in shoes and dies at Mill 117..... 1668
sulphuric acid by flotation process at Mill 130.. 1722
trommel screen steel at Mill 173.....1876, 1877
water at mills.....1413, 1640, 1648, 1664, 1730, 1731
the Rand..... 1410
Washington Arizona plant..... 1411
by Ferraris patent tables, table of..... 1490
Hancock jig..... 1441
working on Montana copper ores..... 1442
Johnston vanners..... 1502
suspended frame vanners..... 1503
Wilfley slimer..... 1506
Continuity of running, effect on costs..... 1127
Continuous grinding pan, Colorado Iron Works 1282
pans..... 1282
kieve..... 727
movable sieve power jigs..... 499
or Boss system of working amalgamating pans . 248
surface round tables..... 1506
tables..... 686
fixed, circular, convex slime tables..... 689
revolving, circular, concave slime tables.... 692
versus intermittent action on breakers..... 55
Convex and concave rolls..... 111
buddle..... 704
Cornish buddles at Mill 185..... 1916
slime tables..... 686
comparison with vanners..... 691
versus concave slime tables..... 692
Conveying and draining belt at Mill 130..... 1720
picking belt at Mill 139..... 1749
belts..... 1585
at mills..1585, 1631, 1667, 1670, 1681, 1706, 1708, 1709, 1771, 1772, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1819, 1831, 1859, 1860, 1861, 1862, 1863, 1882, 1883
New Kleinfontein Company plant..... 1585
on magnetic separators..... 804
Conveyor. Aultman coal..... 2031
belts, layer of coarse ore to protect belt at Mill 158..... 1826
cold ore to protect belt..... 1807
Leviathan..... 1585
method of cleaning..... 2031
of Wetherill magnetic separator, proper speeds for..... 1523
portable at Mill 167..... 1857
self-oiling carrier for..... 1585
tripper at Mill 124..... 1691
for discharging..... 1586
use of with Blaisdell excavator at Mill 117... 1670
notes on a 75-foot..... 2031
Conveyors..... 859, 1582
See Individual Mills in Chapter XX.
at Mill 135..... 1735
bibliography for..... 884
bucket..... 860
Caldwell helicoid conveyor..... 1582
carrying conveyors..... 1585
classification of..... 1582
different types of. W. R. Ingalls..... 1609
disc, at Mill 124..... 1695
drag or disc..... 1583
push..... 1582
Edison distributing..... 861
endless belt..... 861
for jig tailings..... 588
handling concentrates at Mill 173..... 1881
hoe..... 1582
Kreiss jerking..... 884
pan or plate..... 860
picking on..... 489
push..... 1584
Conveyors, Robins belt..... 1610
rubber belt..... 859
scraping..... 860
screw.....861, 1582
Cook, R. A., magnetic plant at Dannemora, Sweden. 1175
Wenstrom separator at Dannemora mine, Sweden 833
Cooley, G. T., dressing zinc ore in Missouri..... 1180
jig..... 643
number of sieves..... 590
shafts for..... 532
tank..... 522
width of sieve..... 591
jigs for blende..... 643
Cooling ore from galena roaster..... 1548
Cooper-Hewitt lamp..... 1931
Cooper, J. R., on amalgamated plates..... 749
Copake Iron Works, wash trommel at..... 330
Coppée coal washer..... 2018
Copper, action of gravity stamps on..... 314
amalgam..... 730
amalgamated plates..... 747
amalgamating plates, difficulties in use of..... 1515
and silver-plated plates..... 764
atomic weight of..... 1188
boxes for jig products..... 586
breaking in Mine 44..... 54
clean-up of in stamp mills..... 134
comparison of breaking by hand and by machine 13
concentrated by free settling..... 475
cost of producing..... 1948
crushed by Calumet & Hecla Company in Mill 44..... 259
for jig screens..... 545
riffle cleats on concentrating tables.....1481, 1486
screens..... 354
handbook, Lake Superior copper mines..... 1925
hindered-settling tests on.....611, 617
in tailings of Mill 48..... 130
Lake Superior, adaptability of steam stamps for crushing..... 314
mills.....114, 475
masses cleaned by steam hammer..... 12
native, specific gravity of..... 1189
ore, hand picked..... 482
leaching..... 1167
method for treating low grade. N. S. Keith 2039
mill for..893, 904, 905, 915, 958, 961, 965, 973, 984, 990, 1005, 1022
separated by oil..... 831
screening..... 830
size of grizzly used for..... 340
stamps suited for..... 134
treated at Moonta mines, Australia..... 505
by Collom jigs..... 515
in Mills 44, 46, 47, 48..... 486
percentage of in tailings of Mill 46..... 131
picking of..... 894
plate, annealing of..... 747
preparation of..... 747
screens..... 174
plates..... 179
absorption of amalgam by..... 765
preparation of..... 752
stains on..... 751
precipitated by scrap iron..... 1082
pure, specific gravity of..... 1189
Range Consolidated Company, Champion stamp mill.....1897, 1900
Mfg. Co., rock houses, Michigan..... 2045
removal of..... 251
results of tubular classifier tests on..... 613
riffle cleats for Deister concentrators..... 1488
rock, cost of crushing at Atlantic mill..... 51
crushing by rolls..... 62
stamped at Phœnix Mine..... 140
settling velocity of.....466, 469
silver in..... 766
ores tested by Collom jigs in Mill 42..... 515
specific gravity of..... 3
versus silver-plated plates..... 748
wire cloth for jig sieves at mills 1707, 1708, 1869
Cordier, E., Vapart disintegrator..... 299
Core for magnets..... 794
Cores of rolls..... 65
Corliss engines 906, 958, 973, 982, 986, 987, 1057, 1091
Cornacchino Mine, Tuscany, mill at..... 1074
Corning, Frederick G., Corning belt concentrator... 729
table..... 669
Cornish convex buddles at Mill 185..... 1916
feeder..... 856

Cornish frames 704
jigs 506
pump 994
rolls 109, 112
at mills 1714, 1868
stamp mill for tin ores 2012
stamps 230
tin concentration works, roasting for porosity at 829
dressing. E. Walker 2038
mills 1119
ore, crushed by Husband stamps 141
practice 1915
works 704
vanning shovel 1152
Cornwall, England, Acme table for treating tin slimes 1506
cost of crushing by rolls in 104
Elmore vacuum oil process in 1559
jigging in 609
kaolin washing in 1077
kieves in 727
labyrinths in 448
milling in 1173
mills in 1176, 1180, 1185
rolls in 111
runs in, on tin ore 478
stamps in 228
system of tin dressing. C. M. Myrick 2044
tin dressing in 1081
E. Skewes 2037
E. Walker 2038
use of rag frames in 1507
Corrosion of jig screens 545, 547
screens 354
Corrugated belts for vanners 647, 650
Frue vanners at mills 1703, 1868, 1870
Johnston vanners at Mill 167 ..... 1858, 1859
versus smooth belts for vanners 650
iron for mill buildings 1088
rolls 106, 110, 111, 2010
at Mill 152 1806
description of Allis-Chalmers type 1242
table of 107
sizes, capacities, and power 1243
stamp screens 226
Corundum, broken by heating and quenching 9
dressing 1176, 1181, 1183, 2029, 2030
Hill, North Carolina 57
mill at 1078, 1079, 1176, 1184
milling. H. E. T. Haultain 2025
in Canada. D. G. Kerr 2025
ore, mill for 1078, 1184
specific gravity of 1189
washing 333
pan for 335
Cost accounts 1122
and extraction 1939
bibliography for 1173
details of for breaking 50
of blanket tables 703
blowing dust from coal 817
board at mills 1100
breaking 51, 57
ore 1222, 1223
in Gates breakers 1222
buckets for conveyor 861
calcining at Mill 137 1549
changing heads and concaves, Comet breaker 47
chemicals for pan amalgamation 250
coal 1092
cobbing at Mill 186 1917
concentrating lead zinc ores. A. Bordeaux 2049
concentration 2
at Butte. C. W. Goodale 2048
copper refining at Mill 173 1881
crushing 60, 1222
at mills 1222, 1883
by breakers 49
Huntington mills 281, 1318
jaw breakers, table of 50
Minnesota Iron Co. 51
rolls 104
spindle breakers, table of 50
stamps 205
for interest, taxes, insurance and depreciation 205
steam stamps 134
road material 51
cyaniding 1028
at Mill 106 1642
decantation slimes plant, Mill 108 1647
Cost of direct smelting 1
dredge and equipment 1654
dredges 1013
dredging 1654
drying 1598, 1599
duck for canvas tables at Mill 103 1633
dust chamber and fans 817
electroplating 755
erecting a complete decantation slime plant in South Africa 1940
large Montana copper-sulphide mill 1939
roasting and magnetic separation plant 1940
20-stamp mill. F. C. Roberts 2049
zinc-lead concentrator 1940
mills 1124, 1618, 1731, 1770, 1875, 1939, 1940
filter pressing plant, Mill 108 1647
fine grinding. W. A. Caldecott 2015
freight 1126
fuel for rotary drier at Mill 186 1917
gold dredging 1009, 1013
milling in Venezuela 1127
grinding at Mill 130 1724
by arrastra 238
tube mills 1291
hand jigging 1129
jigs 499
picking 487, 489, 492, 1438
galena 488
handling material by conveyor belts 1585
ores by Blaisdell system 1603
Heberli mill wear 258
jaw and spindle breakers 52
plates on Blake breaker 48
jigging in Missouri 609
jigs 604
jig screens 547
labor and supplies 1941
at Mill 174 1887
for breakers 51
Huntington mill 281
pan amalgamation 250
stamps 206
in mills 1100
power, supplies, board, etc. See Individual Mills in Chapter XX.
lumber 1126
machines 1125
magnetic separation 810
of iron ore 802
McDougall roasting furnaces 1546
mercury for stamps 206
milling at mills 1619, 1639, 1640, 1643, 1645, 1731, 1793, 1905, 1906, 1916, 1919
in Colorado 1129
Missouri 1129
Nova Scotia. W. L. Libbey 2049
South Africa 2049
J. H. Pitchford 2048
various mills 1126
on the Rand. J. R. Williams 2049
mining 1126, 1940, 2048
and treatment at Cripple Creek, Colorado 1616
effect of attitude of orebody on 1942
economy and speed on 1948
external factors on 1941
internal factors on 1942
size of orebody on 1942
stamping, dressing, etc., at Mill 180 1905
mortar lining 166
oil for separation 831
operating 1940
all-sliming filter-press system 1648
Argall four-tube drier 1600
at Mill 186 1919
flotation processes 1562
Minerals Separation Company, flotation process 1561
Pinder concentrators 1481
Trego roasting furnace 1548
with Cleveland-Knowles magnetic separators 1542
pan amalgamation 250
plant for electroplating 755
power at Mill 105 1639
by gasoline engines 1091
for stamps 205
producing copper at mills 1894, 1956, 1957
general considerations with regard to 1958, 1959, 1960
in Arizona districts 1953, 1954, 1955
Bisbee or Warren district 1954, 1955

Cost of producing copper in Clifton-Morenci district ... 1953, 1954
Globe district ... 1953
Lake Superior district ... 1948, 1949, 1950
Montana district ... 1950, 1951, 1952, 1953
Mount Lyell, Tasmania ... 1957, 1958
Utah district ... 1955, 1956
various districts ... 1958
diamonds at Mill 188 ... 1922
gold ... 1974
at Douglas Island, Alaska ... 1975, 1976, 1977
in Black Hills district, South Dakota 1977, 1978
Cripple Creek district, Colorado .. 1974, 1975
El Oro district, Mexico ... 1980, 1981
Grass Valley district, California ... 1977
Kolar district, India ... 1981, 1982, 1983
San Juan district, Colorado. 1978, 1979, 1980
Witwatersrand, South Africa ... 1983, 1984, 1985, 1986
iron ore concentrates in eastern United States ... 1986, 1987
lead and silver in Broken Hill district 1964, 1965
Cœur d'Alene district ... 1960, 1961, 1962, 1963, 1964
Colorado district ... 1965
Utah district ... 1966, 1967, 1968
lead and zinc ... 1968
in Missouri district ... 1968, 1969, 1970, 1971, 1972, 1973, 1974
lead, general considerations regarding ... 1974
in Flat River district ... 1971
tungsten ore concentrates in Boulder County, Colorado ... 1987
zinc in Joplin district ... 1972
pumping at Mill 180 ... 1906
with Latta & Martin pump ... 1590
quarrying ... 51
refining at Mill 106 ... 1643
repairs on rolls ... 104
vanners ... 663
Wetherill magnetic separators ... 1525
retreatment at Mill 130 ... 1724
rock emery millstones ... 254
roll shells ... 66, 68, 69
running breakers ... 54
log washer ... 324
screening ... 360
screens ... 169, 170, 174
for Bryan mills ... 273
jigs ... 547
shoes and dies ... 182, 183, 184
slime table ... 691
smelting *versus* chlorination ... 1020
stamping ... 221
stamp cams ... 192
milling ... 2048
screens ... 173
stem ... 187
tappets ... 189
steam power ... 1134
tramming at Mill 133 ... 1731
treatment at mills ... 1649, 1920
trommel screens ... 352, 361
tube mill lining in New Zealand ... 2016
vanner ... 691
belts ... 650
water at Mill 179 ... 1899
for stamps ... 206
wearing parts for stamps ... 206
of Blake breakers ... 26
Dodge breakers ... 31
Forster breaker ... 28
spindle breakers ... 46, 47
wear of stamps and Bryan mill ... 274
on Bryan mills ... 272
Costs. See also each machine.
at Mill 97 ... 1621
effect of altitude on ... 1941
climate on ... 1941
homogeneity of ore on ... 1943
losses on ... 1944
marketing the products on ... 1942
population on ... 1941
temperature on ... 1942
transportation on ... 1942
underground conditions on ... 1941
general principles governing ... 1940
high-grade *versus* low-grade mines ... 1948
on the Rand and in California ... 2048
Cosumnes River, California, mill at ... 1023
Cotton cloth for filtering dust ... 883
duck for tables ... 700
Cottonseed oil ... 1097
Coupling of machines ... 1110
Cover for amalgamating pan ... 244
for oil holes ... 1098
Cover jigs ... 537, 571
work of stamps, cleaning up ... 320
Covers for mortars ... 167
Cowenhoven Tunnel Co., rock house ... 485
Coxe automatic slate picker ... 492
gyrating screen ... 345
Coxe, Eckley B., corrugated rolls for coal ... 110
Coxe's finger bar grizzly and gyrating screen ... 385
Luhrig coal jig at Drifton, Pa. ... 640
Coxe's screen ... 2019
Coxheath ore crushed by rolls, sizing test ... 99
Cox, William J., manager of Mill 100 ... 1275
Crab for gravity stamps ... 200
"Crack-proof" vanner belt, the ... 1503
Cradle ... 723
Craig coal washer. W. Scott ... 2051
washing machine. W. Scott ... 2039
Cranberry coal breaker ... 2051
magnet ... 1530
at Mill 156 ... 1531, 1818
magnetite ore, cost of concentrating ... 1135
mill for ... 1180
tests on ... 1176
mill ... 1817
ore, magnetic separation of ... 835
separated by magnets ... 833
Crane at Mill 171 for removing tailings ... 1870
log washer at Mill 95 ... 1617
Crank arm mechanism for jigs ... 535
Crawford mill ... 234
bibliography of ... 295
Cream separator ... 827
Creede, Colorado, milling at ... 1925
milling at. A. Lakes ... 2041
United Mines, Humphrey mill ... 1766
Cremer, R., Baum and Sheppard jigs for coal ... 643
Carr disintegrator for coal ... 298
coal screening ... 385
Hochstedt apparatus ... 838
Cresson, George V., breaker of Blake type ... 23
Co., rolls ... 72
Crickboom log washer at Mill 147 ... 1787
wash trommel ... 330, 334
Cripple Creek, Colorado, concentration at ... 2044
cost of mining and treatment at ... 1616
producing gold in ... 1974, 1975
mill at ... 1038
milling practice at ... 1925
rock house ... 485
treatment of ores. G. E. Walcott ... 2042
Crocker's patent stamps ... 229
Crocoite, specific gravity of ... 1189
Crookes, Sir Wm., diamonds ... 1185
the washing pan ... 2020
Cross compound steam stamps ... 1250
mill, Colorado, gold and silver in amalgam in ... 762
hydraulic classifier in ... 774
mercury trap at ... 774
wells in ... 769
plates ... 741
ratio of gold to silver on plates in ... 763
mine, Blake breaker at ... 1621
sills for gravity stamps ... 153
Crossley pebble mill ... 2014
Croton iron mines, cost at ... 1135
mill at ... 1175, 1180
ore concentrated by magnets ... 798, 803
Sturtevant mill at ... 298
Crown dry concentrating system, description of ... 2026
ore sizer ... 2019
gold dry concentrating plant, Tintic, Utah ... 2044
mill, Georgia. H. V. Maxwell ... 2036
Point, mill at ... 901
mines ... 1174
Reef Gold Mining Company, use of milk of lime for slime settling at ... 1416
mill, details of stamps ... 221
tailings, treatment of ... 2048
Crucible for melting ... 784
Crusher in a stamp mill, description of a fine ... 2014
stamp mill, fine ... 2016
Magic ... 299
McLanahan and Stone single-roll ... 1241
sectional cushioned ... 20

Crusher, Sturtevant 32
Crushers for testing 1137
Crushing. See Breaking.
Crushing 8
and jigging department at Mill 146 1783
screening, separation by 1566
of molybdenite by 1568
article on. L. H. Sturtevant 2009
at Black Hills, S. Dakota. C. H. Fulton 2033
Lake Superior, graded. J. P. Channing 2018
the Simmer and Jack mine 2010
bibliography for laws of 315
choice of breaker for 54
choke 98
by breakers 48
comparisons between wet and dry. F. Merrick 2018
concentrates 1113
cost of 49
at Mill 162 1222
by breakers 49
gravity stamps 205
Huntington mills 1318
jaw breakers, table 50
rolls 104
spindle breakers, table of 50
steam stamps 134
cylinders 65
department at mills 1690, 1709, 1771
dry. P. Argall 2010
rolls for 1224
extent desired 303
final 62
for cyanide, comparison between wet and dry .. 2017
free 98
graded by rolls 103
in sampling 849
laws of 300, 1325
machines, advance in 2018
compared 313
discussion of fine. R. Allen 2014
for cement 2014
kinds of 8
sizing tests of 315
means of computing efficiency. Pearce & Caldecott 2017
mechanics of. C. De Kalb 1340
methods of 8
mill, description of a wet 2017
of Lake Superior iron ore. R. C. Newhouse... 2009
middlings 1119
plant at Kalgoorlie, dry. H. J. Brooke 2035
mills 1748, 1828, 1831, 1871, 1882
ideas on a modern fine. P. Argall 2018
power for. E. A. Hersam 1340
preliminary 9
principle of roll crushing 1224
quality of, by rolls 50
relative merits of wet and dry crushing. P. Danckwardt 2018
ribbons 101
rolls 62
rules for power used 309
single stage 103
tests of Gates and McCully breakers 45
tabulated results of. J. B. Porter 2017
theory of. E. A. Hersam 2018
with stamps, coarse 2015
work required for 304
Cryolite, specific gravity of 1189
Crystallization affecting separation 890
effect on mill scheme 1120
of stamp stems 188
Cubic foot of broken ore, weight of 1160, 1190
measures, equivalents of 1187
Culm banks, methods of washing. B. T. Berthelot 2050
classifiers at Mill 134 1733
Cumberland Ely Copper Company 1865, 1866
Cummer drier 880
Cummings mill, bibliography for 292
ore granulating mill 255
mill 232
Cumulative direct plot 1140
logarithmic plot 1140
plot of sizing tests 1139, 1144
Cunnack's pulverizer 232
bibliography for 293
Cuprite, specific gravity of 1189
Currents in box classifiers 434
settling tanks 451
velocity of in settling tanks 454
Current water wheels 1090
wheel dredges 1013
Curtis, A. H., ball mills 293
Berdan's pan 291
Blake, Gates, Comet, Dodge, Marsden breakers 59
Bryan mill 295
Crawford mill 295
crushing machines 316
Cyclone pulverizer 299
Cyclops mill 294
Harvey's stamp, Hope's compound battery 227
Howland pulverizer 297
Hunt'ngton mill *vs.* stamps 297
Husband pneumatic stamps 143
Krom's rolls 111
Lamberton mill 295
Leviathan pulverizer 299
Morel and Hall's mill 295
Niagara crusher 294
on breakers 59
pneumatic pulverizer 299
Schranz mill 296
stamp mills, Krom rolls, Huntington mills 1182
Curve of cams 196
Curves of film sizing tests 708
jig work 632
settling velocities 467, 473
sizing tests 1139, 1144
stamp velocities 216
Cushman and Hubbard Prevost, decomposition of feldspars 1418
A. S., decomposition of the feldspars 1400
effect of water on rock powders 1418
Custom milling 482
mills 915, 978, 1029, 1035, 1157
bins for 842
plates in 748
sampler of Mill 102 1629
Cut gears 1096
Cutten, W. H., gold dredging in New Zealand .1179, 1184
Cutter, G. A., tests on strength of granite 302
H. C., testing plant at the University of Minnesota 1179
Cutting down in sampling 849
Cuyahoga steam stamp .. 114, 118, 119, 121, 122, 123, 126, 127, 128, 133
Cyanide, amount used on plates 757
effect of on plates 757
for cleaning mercury 786
preparing amalgamating plates 752
machinery 1600
of silver used for electroplating 755
plant for gold mill tailings 1017, 1028, 1114
Robinson riffle in 721
the Windsor in the West Rand 478
practice in S. Dakota. J. Gross 1419
process, rolls for 111
sand-treatment at Mill 117 1670
slimes plant, Mill 106 1642
-treatment at Mill 117 1671
tests 1166
used on amalgamating plates 751, 760 1619
Cyaniding at El Oro, Mexico. C. Butters 1942
C. Butters, E. Hamilton 2040
Goldfield, Nevada. M. R. Lamb 1922
the Homestake. C. W. Merrill 1419
bibliography for 1173
in New Zealand. J. Park 2024
of gold and silver ores. Julian and Smart 1323
with and without concentration 2047
Cyanite, specific gravity of 1189
Cycle of gravity stamps 216
Cyclone beater at Mill 186 ..... 1917, 1918
disintegrator and pulverizer 1319
dust collector at mills 1637, 1803, 1863
pulverizer 236, 288, 297, 817
bibliography for 298
table of details of 289
Cyclops mill 234
bibliography for 294
Cylinder, Alsing 266
crushing 65
steam 122
Cylindrical driers 880, 1596
Alsing Company, J. R., ... 1597
American Process Company 1597
Argall 1599
retorts 781
roasting furnaces at Mill 148 1793
trommels 348
wash trommel 335

LIBRARY OF THE UNIVERSITY

D

Daggett, E., on lixiviation ... 1167
Russell leaching process ... 1175
Dahlonega district light stamps ... 221
mortar block ... 148, 150
mortars ... 152
Daily amalgam, gold and silver in ... 762
Dalhousie University, the ore dressing apparatus at the. F. H. Sexton ... 2048
Dalton classifier ... 398
hydraulic classifier ... 398
Daly-Judge mill ... 1724
Park City, Utah ... 1923, 2038
P. A. Gow, A. M. Hobart, G. S. Kruger, F. H. Parsons ... 2035
mine and mill ... 2042
Daly-West mill. W. I. Spencer ... 2035
Park City, Utah ... 1923, 2038, 2042
Mining Company ... 1726
slime plant, Park City, Utah ... 2042
Dam, Belgium, Rittinger tables at ... 668
Dams for classifiers ... 406
Dana, E. S. ... 2, 3
mineralogy ... xix
minerals ... 1173
system of mineralogy ... 1188
table of hardness ... 2
Dana's tube mill ... 2017
Daniels, C. H., on settling kaolin ... 1149
Dannemora, Sweden, magnetic concentration at ... 833
separation of iron ore ... 801
mill at ... 1175
Darlington, J., on breakers ... 60
rolls ... 111
trommels ... 385
Darrow, W. E., testing of gold mill tailings ... 2049
Dash pot for steam stamps ... 127
of Nordberg steam stamp ... 1247
Data from the mills concerning settling tanks ... 458
of rolls, table of ... 64
Datolite, specific gravity of ... 1189
Davey, Paxman and Company ... 282
Davidsen, formula for calculating amount of pebbles for charging tube mill ... 1288
power required by tube mills ... 1289
speed of revolution of tube mills ... 1337
tube mill ... 1280, 1297
cost of grinding by ... 1292
Davies, D. C., Blake breaker ... 56
free-settling velocities ... 476
gravity stamps ... 223
Husband and Sholl pneumatic stamps, Patterson spring stamp ... 143
hydraulic mining ... 1173
Marsden breaker ... 56
metalliferous minerals and mining ... xix
movable sieve and Harz jigs ... 639
E. H., amalgamation ... 787
Blake-Marsden, Dodge, Gates breakers ... 56
breakers ... 56
buddles, slime tables, vanners, kieves, Hendy concentrator ... 727
Clarkson-Stanfield process ... 837
Crickboom wash trommel ... 334
free-settling velocities, hydraulic classifier, pointed boxes ... 476
gravity stamps ... 223
grizzlies and trommels ... 384
Grüson ball mill ... 293
Huntington mill ... 296
jig bed ... 574
Krom's rolls ... 109
Lion mill ... 294
machinery for metalliferous mines ... xix
material of bottom bed ... 574
mill schemes ... 1173
Monarch magnetic separator ... 832
movable sieve, Harz, Bilharz jigs ... 639
on limit of sizes jigged ... 605, 606
roll speeds ... 87
Davis Colby shaft furnace for roasting ... 814
filter press at Mill 102 ... 1630
Davis, F. M., Iron Works Co., Ferraris ball mill ... 1323
patent cams ... 194
roll speeds ... 87
M. C., on Tremain stamp ... 139
rolls ... 111
at Mill 144 ... 1771, 1772, 1773
Davy No. 3 Mill, Joplin, Missouri ... 2042
Day, D. T., concentration of black sands ... 2047
Dayton, Nevada, amalgamating pan ... 241
mill at ... 1184
Dead plate on trommels ... 356
sea water, weight of ... 1188
Deadwood, Terra mill, amalgam in ... 783
order of drop ... 215
De Bavay flotation process ... 1555, 1562, 1568, 2030 2038
at Broken Hill ... 1562
De Beers Co., diamond dressing ... 831
Consolidated mines ... 1080
Ltd. ... 1923
Mining Company ... 1922
Debris, control by government of ... 2045
Deck cover, linoleum for ... 1467
for Wilfley slimer ... 1504
table ... 1467
of New Standard concentrator, linoleum for ... 1479
round tables, material for, at Mill 162 ... 1846
Decomposition of feldspars, A. S. Cushman and Prevost Hubbard ... 1418
DeCourteney, H. W. ... 225
gravity stamps ... 225
Decrepitation ... 1611
and screening ... 839
at Mill 137 ... 1741
heating for ... 829
of minerals ... 5
separation by ... 1565
use made of, in mills ... 890
Deep double trough classifiers ... 416
pocket hydraulic classifiers ... 409
free-settling classifiers ... 1371
hindered-settling classifier ... 1387
Deetken, G. F., Atwood amalgamator, Eureka rubber concentration in California stamp mills ... 789
kieve ... 1181
stamp battery ... 729
Definition of free settling and hindered settling ... 229
of hindered settling ... 464
Definitions for jigs ... 484
Deflection of wire rope ... 494
Deflectors for *spitzkasten* ... 1095
in settling tanks ... 440
with plates ... 458
De Gournay and Suisse, Mathet, Hochstrate apparatus ... 742
Deister concentrator ... 837
at the Baltic mill. L. S. Austin ... 2022
concentrators ... 2023
at mills ... 1488
De Kalb, Courtenay, adjustment of the stamp mill ... 1489, 1680, 1896, 1900
amalgamation inside the mortar ... 2011
definition of slimes ... 2024
De Kalb classifier ... 1398
discussion of conditions under which crushing is effected ... 2020
graphic records of screening tests ... 1326
mechanics of ore crushing ... 1340
on settling tank ... 1340
slimes ... 459
sizing test on sample grinder ... 1419
stamp mill practice ... 257
standardization of screens for testing ... 2048
tests on corundum ... 2019
De Kalb's perforated-board classifier ... 1184
De Lamar, J. R., on Griffin mill ... 1402
mill ... 284
Delameter coal-testing device ... 1993
De Laval centrifugal pumps at Mill 124 ... 1695
separator ... 827
Delesse on magnetic attraction ... 796
Dellvik-Gröndal magnetic separator ... 804
Del Mar, A., advantages of stamps ... 2013
discussion of plate amalgamation ... 2024
dredging, cost of ... 2036
stamp mill experiences ... 2049
milling in California ... 2045
Deloro, Ontario, milling at, an auriferous mispickel at. P. Kirkegaard ... 2034
Delprat, G. D., Broken Hill milling practice ... 2038
concentration at Broken Hill ... 1568
flotation process ... 1555, 1561
at Mill 129 ... 1561, 1718
testing for ... 1993
ore dressing at Broken Hill ... 1923
process of flotation. D. Clark ... 1568
Demaret, L., Bartle pulverizer ... 294
breakers ... 61
Cornish stamps ... 230

Demaret, L., Husband pneumatic stamp..... 143
mechanical *versus* hand crushing 61
Nicholas pulverizer 292
stamps and other pulverizers..... 316
tin ores in Cornwall 1185
Tregoning pulverizer 297
Demond, C. D. viii
on electrolytic dissociation of slimes 1414
Denny, G. A., and H. S. Rand metallurgical practice 1923
Rand mill equipment..... 2041
design and working of gold mill equipment .. 1261
equipment of stamp mills 2012
hydraulic stamp 1257
mill of the Van Ryn gold mines estate 2041
on hand picking..... 2021
sectional guide blocks 1269
H. S., discussion of grading analysis 2048
sizing tests on slimes and sands 2019
slime treatment on the Rand 1419
Density of liquids affecting concentration 3
effect on free settling 465
pulp for slime tables 695
Denton, F. W., crushing..... 57
plant at Minnesota Iron mine 57
rolls *versus* steam stamps at Mill 179 1900
Denver, cost of mill at 1126
Engineering Works Company, Blake breaker .. 1203
gravity stamps 1278
grinding machinery 1323
revolving grizzly 1353
Richards' pulsator classifier 1388
jig 1459
-Shepard *spitzkasten*..... 1401
and Richards' pulsating classifier 1419
rigid rolls 1235
at Mill 181 1906
scoop feed for tube mills 1287
tube mill 1280, 1296
at Mill 143..... 1770
Fire Clay Company, Case laboratory breaker 1204, 1223
Depreciation expenses..... 1123
Depth of bank in trommels 380
bed on concentrators..... 1510
Harz jigs at mills ..1750, 1751, 1877, 1878, 1879, 1929
Hodge jigs at Mill 180 ....1902, 1903, 1904, 1905
Derrick, W. H., tin ore in the Malay Peninsula 1182
Derr, Louis viii
Derry, W., Husband stamp 143
Description of Blake breaker..... 13
Desert mill, Tonapah, Nevada. A. R. Parsons 2045
Power and Mill Company 1666
life of shoes and dies at 1277
Designation of holes in stamp screens 172
Design of Blake breakers 1201
cams 196
classifiers..... 1432
electro-magnets 790
machines 1096
milling plants. S. A. Worcester 2049
mills..... 1126
mining machinery. S. H. Pearce..... 2048
A. C. McCallum 2048
rolls 78
settling tanks..... 454
sulphide mill, 150 ton. A. Harvey 2041
two small mills. S. I. Hallett..... 2043
Desloge, J. M., Blake breakers..... 57
Desloge mill for lead in Missouri 1175
mill 1175, 1185
disposal of concentrates in 57
trunking machine in 587
De Soto mine ore, Krom air jig on 824
Dessauer, H. A. von, temperature of water for amalgamation 789
Details of Blake type of breakers from the mills.... 23
cams, table of..... 192
clean-up of gravity stamps 202
Comet breaker 41
cost of crushing by breakers..... 49
crushing by rolls..... 104
steam stamps 135
dies 180
Dodge breaker from mills 30
dressing and cleaning plates 757
inside plates 178
jig screens..... 540
McCully gyratory breaker 44
rings from mills, table of 122
Details of screens..... 168, 170
for stamps, table of 121
spindle breakers in the mills 46
stamp bosses..... 186
cams 192
shaft, table of 128
stem 187
tappets 189
staves from mills, table of 123
steam stamps 126
Sturtevant roll jaw breaker 33
trommels 347
valve action 127
whole current box classifiers 444, 446
Detroit Copper Mining Company of Arizona..... 1874
milling practice of the 2041
sizing test of Bryan mill product at 1310
Development, effect on mining cost 1128
Devices for safety on steam stamps 127
used on convex slime tables 689
Devonshire, kaolin washing in 1077
Dewaterers at Mill 138 1745
Dewaterer, shovel..... 2032
Dewatering device at Mill 141 1760
screens 1591
at mills..... 1858, 1867
Fitzgerald 2032
Rogers' dewatering screen 1591
shaking launder at Mill 172 1872
wheels 1590
at mills 1591, 1725, 1772, 1773, 1878, 1879
Fleming..... 1590, 1609, 2031
Dewey, C. E., Blake breaker *versus* Dodge 57
on breakers 57
sizing tests of jig products 642
Diagram of sizing tests of products of Tustin mill and stamps 302
Dial cocks 858
for classifiers..... 387, 388
gravity stamps 199
on jigs 538
Diamagnetic substances 796
Diameter of classifier spigots 404
iron pipe 405
rolls 83
shafts in jigs 533
slime tables 696
trommels 349
effect of 379
wire for screens..... 371
Diameters and velocities of quartz grains..... 2003, 2004, 2005, 2006
areas of circles 2000, 2001, 2002, 2003
of stamp shoes and dies 181
Diametral ratio between quartz and galena hindered settling 1460
Diamond dressing in S. Africa. A. F. Williams.... 2040
fields of South Africa, washing pans used in ... 333
pans 335
specific gravity of 1189
washing..... 839, 1080, 1178, 1179, 1185
at Mill 188 1921
in Africa. R. Stokes 2046
W. H. Mungall..... 2034
Brazil. H. W. Furniss..... 2038
South Africa..... 333, 2033, 2040, 2042
G. F. Williams..... 2043
tube mills for..... 2014
Diamondiferous earth, washing pan for..... 335
Diamonds recovered by greased plate 831
separated by weathering..... 830
Diaspore, specific gravity of..... 1189
Diepenlinchen, jigging four minerals at..... 590
Luhrig tables at 670
mill, jigs in..... 597
Die rings and roller shells in Huntington mills 280
for Huntington mill 280
Dies 174
and shoes for grinding pans, wear of 1289
at Mill 117 1668
for amalgamating pans 245
gravity stamps, life of 1277
steam stamp 120
weight, life, etc..... 122
life of 184
table of details of 180
Diescher coal jig 520, 640
connecting rod for..... 530
Differential-motion jig, Hodge jig..... 1444
New Century jig 1446

Differential motion, Woodbury jig 1447
variable-crank mechanism for jigs 1457
Difficulties in concentration 892
of dredging 1009
screening 372
Dillon concentrator 2022, 2023
Iron Works, Perfection ore feeder 1578, 1609
Dillsboro, North Carolina, kaolin washing at 1149
Dilution of fine slimes 1121
Dimensions of Abbé tube mills at Mill 101 1626
Comet breaker 44
Ding's magnetic separators 1541
jig sieves 591
Linkenbach pointed boxes 441
Richards' pulsator jig, table of 1455
shoes and dies 181
stamp dies 180
mortars 165
Sturtevant balanced rolls, table of 1234
tappets 189
tube mills at Mill 103 1632
Wetherill magnetic separators, table of 1522
Dimmick classifier 1417, 1420, 2020
J. O., on classification 2020
sizing before amalgamation 1514, 1520
& Son, distributing launder 1417
patent slime table 1507
Ding Electromagnetic Separator Company, the Ding separator 1540, 1568, 2029
at mills 1541, 1663, 1737, 1739, 1759
description of the 2027
table of weights, dimensions, and power for .. 1541
roasting furnace 1548
at Tripoli mine 1548
Dingey mill 233
bibliography for 293
Diorite, strength of 301
Dipper dredge 1007, 1011
sample 845
Direction of rotation for tube mills 1289
Direct pumps 871
smelting, cost of 1
Dirt 900
Disadvantages of gravity stamps as compared with rolls and grinders 222
Krom jig 825
springs on jigs 517
Disc conveyors 1583
at mills 1583, 1695
motion for accelerated jigs 536
Discharge, bell, for jig concentrates 506
for jig 510, 518, 553, 576, 577
concentrates 500
in Krupp Harz jig 1446
New Century jig 1445
Woodbury jig 1448
Leavitt steam stamp 993
steam stamps 129, 1003
Krause mortar and mortar jig 1256
tube mills 1287
into the hutch in jigs 586
of belt conveyors 860
elevators 862
jig concentrates by rakes 502
ore bins 842
products on Hooper air jig 821
settling tanks 458
stamps, area of 209
height of 212
roll for vanner concentrates 647
with unwatering sieves 586
Discussion of design of Blake breakers, by W. G. Bryant 1201
sorting tube results 467
Disintegrating and screening 839
Disintegration and screening for graphite ore 1074
followed by screening 830
settling 830
Disintegrators 236
and pulverizers 1319
bibliography for 299
Bourdais 899
Brink and Hübner 284
Carr 284
Stedman 284
Vapart's 289
Dispersion of magnetic lines 791
Displacement pumps 1589
Disposal of concentrates 586
tailings 1113
Dissemination of mineral affecting crushing limit ... 304
Distances between rolls for various angles, in author's tests 311
Distillation of mercury 782
Distilled water, effect of in settling 474
Distl-Susky screw grate screen 386
Distributing conveyor 861
at Mill 143 1769
devices 1417
or sizing launder 1417
tanks 449, 1115
Distribution of amalgam from plates 764
gold recovered in mill 749
pulp in settling tanks 451
Distributors 857
at Mill 126 ..... 1707, 1708
bibliography for 884
Blaisdell 1600
centrifugal sand distributor 1602
Butters & Mein at Mill 106 1641
for amalgamated plates 743
buddles 704, 706
canvas tables 700, 701
feed on Roberts' slime tables 691
slime table feed and water 688
stamp mills 772
vanners 646
machine 857
mill 857
revolving distributor or divider 1418
Ditches for water 1105
Dives-Pelican Mine, Samson breaker at 1203
Robert, advantages of hand picking 493
Dividend gold saver 2030
Division of concentrating 318
mills for different ores 1111
Dodd buddle. G. Attwood 2022
buddle at Mill 96 1481
disc water wheel 1022
table 675
tables at Mill 96 1618
water wheels 1024, 1089, 1090
W. G. viii
on amalgamating pan 248
Dodge breaker 28, 56, 60
at Mill 183 1913
compared with Blake 33
Humboldt type 1206
improvements on in Mill 26 35
movements on, made by Gates Iron Works 34
Parke and Lacy Company 34
perspective of 29
section of 30
sizes of 30
Sturtevant-Dodge type breaker 1205
table of details 30
used in stamp mills 1014
wear of 31
M. B. 28
jaw breaker 28
mill, bibliography for 294
pulverizers 231, 233, 262
number used 231
sizing box 416, 478
Dolbear, Clinton E., electrostatic separation 1550
Dolcoath mill 1082
Cornwall, concentration at the. R. A. Thomas 2040
strips 1082
tin mill 1183
Dolgelly, Wales, mill at 1072
Dolomite, with disseminated galena, crushed in Mill 25 ..... 47, 98
ore, weight of 1190
specific gravity of 1189
Domeykite, specific gravity of 1189
Donahue, P. J., oiling device for amalgamating pan 247
Donald, J. T., Cylcone fibreizer 298
Dörnberg and Aurora mill 1177
classifiers at 477
sieve scale at 367
and Aurora works, sizes of ore hand picked at .. 487
mill, jigs at 641
Dorotheer mill 973
Dorr classifier at Mill 103 1632
of Lundberg, Dorr, and Wilson, Black .. Hills, South Dakota 1344
Dorr, John V. N., Dorr mechanical classifier .. 475, 476, 477, 1343
Double-cone classifiers 426

Double-cone classifiers at Mill 117....1668, 1669
hydraulic classifier 1381
table of sizes 1381
tubular classifiers 476
Double crimped wire screens 370
screens 354
discharge for jigs 583
mortar, Traylor 1266
on stamps 209
eccentrics for jigs 531
iron frame for jig sieves 540
issue in stamps 167
-Rittinger sieve scale 1361
trough classifiers 416
Douglas Island, Alaska, cost of producing gold in...1975, 1976, 1977
mill at 1133
mortar blocks on 148
Douglas, James. Blake, Dodge, Forster, Comet, and Gates breakers 57
breakers 55
gravity stamps 224
Harz jigs 640
ore dressing 1175
principles and operations of crushing and grinding machinery 2017
J. Jr., Ball stamps 142
on cost of crushing by steam stamps 134
Drag conveyors 1582, 1583
Dragon breaker 58
Dragstone mill 237
Drained ore, moisture in 1107
Drake, F. M., gold stamp mill of Wentworth Company at Lucknow, New South Wales 1181
plates in Wentworth mill, Lucknow, Australia. 788
shoes and dies 181
Wentworth Goldfields, Proprietary Co., stamps at, New South Wales 227
W. F., amalgamation 789
on temperature of amalgamation 767
Draper's dry concentrator in Australia 2029
Dredge 898
at Ruby, Montana 2043
bucket in New Zealand 2037
current motor 2044
for phosphate 897
limit for Stewart River district, Alaska. A. W. Robinson 2037
New Zealand gold. J. P. Smith 2046
yield of a California 2037
Dredges and equipment, cost of 1654
at Ruby, Montana, electrical 2043
Bucyrus 1654
comparison of American and European. F. C. Perkins 2042
old and modern style 2044
construction and operation of. D. K. Blair ... 2034
detailed comparison of. R. L. Montague 2034
different types of. B. Cunningham 2035
electrical equipment of gold. C. W. Whitney.. 2041
history of. J. P. Hutchins 2037
hydraulic power for 2036
improvements in gold. G. E. Walsh 2037
revolving *versus* shaking screen in 1653
riffles for 722
Risdon 1654
Dredging 1652
P. G. Morgan 2036
amalgamated plates and riffles in gold. J. M. Sweeney 2041
article on gold. R. H. Postlewaite 2041
at Boise, Idaho 2043
Golden, Colorado. K. Thomas 2046
Nome, Alaska. J. P. Hutchins 2039
gold, G. P. Grimsley 2036
Oroville, California 2037, 2044
N. B. Knox 2040
Ruby, Montana, gold. J. P. Hutchins 2039
by the Oroville Dredging Co., California 2044
water power. J. M. Gowan 2046
cost data on. Alex. Del Mar 2036
cost of 1654
gold 2046
discussion on. L. J. Hahl 2037
for gold....1007, 1181, 1182
tables for 703
gold 2046
A. W. Robinson....2035, 2041
T. F. Van Wagenen 2043
W. S. Russell 2041
Dredging gold, how to make it pay. A. W. Robinson.. 2035
saving tables used in. C. W. Purington.... 2041
ground, testing of, R. M. Downie 2043
in Alaska. O. Halla 2045
gold. C. A. Tupper 2041
Borneo, gold 2036
Brazil. F. C. Nicholas 2046
British Columbia. R. L. Watson 2041
California 2042
A. G. Hillen 2046
L. E. Aubury 1924
costs of 2045
details of. G. P. Grimsley 2036
notes on. L. J. Hohl 2044
Colorado, cost of. W. E. Thorne, E. J. Moore 2045
Europe. L. St. Rainier 2047
Grasshopper Creek. R. W. Bell 2041
Guiana, S. America. O. Rehwagen 2039
Hungary and Transylvania 2040
Idaho. F. Powell 2036
New South Wales 2034
failure of gold. D. K. Blair 2034
successful tin 2034
unsuccessful 2034
New Zealand 2043
J. W. Gray 2043
F. W. Payne 2039
D. B. Sellars 2043
gold 2036
A. C. Perkins 2041
1906, gold. J. P. Hutchins 2038
Oregon 2043
Russia 2043
Siberia. C. W. Purington and J. R. Landfield, Jr. 2035
Tierra del Fuego 2039
J. D. Roberts 2040
Venezuela. F. Owen 2036
modern gold. H. G. Clark 2046
on the Feather River, California 2043
Klondike. J. P. Hutchins 2038
Saskatchewan. I. Cowie 2034
Snake River, Idaho. R. Bell 2036
operation, returns from 2046
plants 1006
pneumatic tube in 2044
power plants for 2036
prospecting and operation. R. H. Postlewaite . 2040
river. C. C. Longridge 2036
sluice extension *versus* elevator in 2045
sluices and riffles in. D. H. Stovall 2045
tin 2040
tables for 703
with a Hammond dredge 2036
Dressing of belts 1093
of plates 756
plates at Mill 114 1663
tin ore 1081
Driers 879, 880, 1595, 1609
American Process Company driers 1597
and drying of ore. P. Argall 1609
Argall cylindrical driers 1599
at mills....1762, 1807, 1813, 1822, 1860, 1917
capacity of drying floors *versus* mechanical driers 1596
classification of 1595
cylindrical driers 1596
drying floors 1596
Edison tower drier 1600
Grill four-compartment direct heat driers 1596
J. R. Alsing Company driers 1597
ore. C. O. Bartlett 2031
revolving, at Mill 138 1746
cylindrical drier at Mill 135 1735
shaft, at Mill 151 1803
Drifting tool for stamp cams 193
Drifton, Luhrig jig at 640
rolls at 110
Drill points in mills 1115
Driver in amalgamating pan 247
Driving mechanism for cam shafts 197
clutches 198
gearing 198
gravity stamps 197
rolls 75
tightener 198
trommels 356
table of 76
Drop between jig sieves 524, 549
plates 743

Drop hammers 12
limits of speed and height of, due to mortar .. 218
maintaining height of in gravity stamps 200
of gravity stamps, order of..... 1274
on amalgamated plates..... 737
order of. C. S. Richardson 1278
for stamps 214
Drops in amalgamated plates 733
number of in gravity stamps 214
of stamps, number and height of 215
Tremain stamp, number of 138
Drumlummon mine ore 1027, 1040
Drum magnetic separators..... 797
Dry blanket method of concentration 825
blowing in prospecting for gold ores 2029
concentration 815
at Manhattan, Nevada. C. T. Rice 2027
Roseberry 2047
Round Mt., Nevada. G. A. Packard 2038
bibliography for 837
in Australia. B. Dunstan 2027
Australia, comparison of..... 2030
on the Cammett table 2022
crusher, Langley's improved 274
crushing and cyaniding at the Luipardsvlei mine.
F. White, G. H. Furnee 2047
by Edison process 2010
stamps 226
in Colorado 1244
rolls for 1224
house for men..... 1102
magnetic separator, Conkling 809
-ore sizer, Keedy 1555
pan, for clay 1075
panning and blowing..... 825
placer machine 838, 839
screening *versus* wet 1139
separation 890, 891
separator used in Germany 2029
silver mill..... 1039
milling 1176
stamping 221
at Ontario mill 210
table, Sutton, Steele & Steele 1554
vanner 838
Dryers. See Driers.
Drying bin at mills 1625, 1669, 1705, 1912
for concentrates 1570
floors 880, 1596
at Mill 143 1770
in kilns..... 899
iron ore 1054
kaolin 1077
necessary for air concentration 826
of clay 1077
of ores. W. R. Ingalls..... 1610
slimes at Mill 129 1717
use of hot fines for drying coarse ore at Mill 158.. 1826
Dubuat, M., Hydraulique et Pyrodynamique..... xix
launders..... 885
on transporting power of water 878
Duck for canvas tables 700, 701
at mills.....1696, 1755, 1779
Dudley, A. P., spring for Collom jig 517
W. L., amalgams 787
Dufferin mill 1099
Duffield, P. W..... 1181
and W. McDermott, amalgamated shaking plates 787
gold amalgamation 1173
hand jig 1182
on amalgamated plates 741
testing jigs..... 1151
Dummler, K., crushing and washing clays 1173
Handbuch xix
Dump at Mine La Motte, Missouri, treating the old 2045
for tailings 1113
of the Bellevue Colliery, method of working.
G. W. Harris 2041
Dunham's spring stamp.....141, 143
Dunlap Manufacturing Company, perfect clay screen 1357
Dunnellon, Florida, mill at 899
Phosphate Co., mill.....xxv, 899
Duplex breaker 60
of Blake type 21
Callow screens at Mill 123..... 1689
vacuum-pumps at Mill 117 1673
Dupont, O., and Ch. Quéhant, dressing lead and zinc in Belgium 1185
Durango, sectional iron stamp frame for..... 161
Dust blown from coal 817
Dust chambers 885
difficulty of concentrating 820
fans and chambers..... 883
in dry concentration 825
prevention 1099
removed by air blast 816
remover at Mill 141.....1762, 1763
separator 828
at Mill 151 1803
settler at Mill 135 1736
settling apparatus. T. White 2032
device 2032
system at Mill 141 1764
Dusting chambers, Edison 816
Duty or capacity of trommels 359
Dyckhoff breaker..... 57
Dynamo for lighting 1100

E

Eagle Foundry Co., rolls 76
West Va., Stedman disintegrator at 285
Eames, W. H. 289
Earnschleugh dredge No. 2. 1179
dredge, tables on 703
Earth in bank, weight of 1190
Ease of separation affecting capacity of jigs 601
extraction..... 1117
number of jig sieves 589
Eastern United States, cost of producing iron ore concentrates in.....1986, 1987
Eastman, G. W., analysis of work on free-settling velocities 1423
Eastwood improved lifting magnet..... 1532
at Mill 164 1532
Eccentric for jigs.....510, 531
gears for steam stamp valve motion 123
grinders 313
jig, the Bradford 400
mill. James Bogardus 259
Eckart rolls 111
Economic minerals in mills xxv
Economy of hand picking 487
large engines 1092
picking out rich ore 481
Eddies in riffles 721
Eddy current in classifiers 437
Electric Mfg. Co., dynamos 1062
Edge runners 234, 269, 1305
bibliography for..... 295
Bryan roller quartz 271
compound..... 296
Langley's improved dry crusher 274
Edgestone mills 235, 269, 1075
for graphite ores..... 1075
Edison concentrating plant 834
corrugated rolls 106
at Mill 152 1806
distributing conveyor 861
distributor 858
dry gold separation process. C. M. Chapman . 2027
drying kiln 881, 1600
dusting chambers..... 816
giant rolls 105
magnetic concentration mill..... 1056
concentrating plant, New Jersey and Pennsylvania Concentrating Company mill xxix
mill.....1183, 1184
plant 1179
separator for fine materials 810
method of preventing blinding of screens 373
New Jersey, mill at 1056
on life of belts..... 864
opinion on shape of hole in screens 369
process of crushing..... 2010
screens 341
separator 812
smooth rolls at Mill 152..... 1806
special forms of rolls.....110, 111
sprocket drive 860
stationary screens 341
three-high rolls 107, 2010
T. A., on belts 1094
and J. Birkinbine, Blake system..... 57
Buchanan, Wenström, Conkling, Monarch and Edison separators 833
on blinding of screens..... 373
breakers..... 57
lubrication..... 1098
magnetic concentration 1058

Edison, T. A. on power for crushing 310
mills 1093
trajectory in screening 369
tower screen at Mill 152 1809
Edman, J. A., arrastra 290
Edwards, G. E., Woodbury jigging system 2022
J., & Co., on centrifugal pumps 869, 870
J. H., on Griffin mill 284
R. M. viii
W. M., Helena and Frisco mill, Idaho 1178
Effectiveness of blow of gravity stamps 218
Effect of acid water on screens 173
air currents on mechanical sampling 1576
carbon in roasting for magnetism 1544
centrifugal force in trommels 373
dissolved substances in settling fine slimes ... 1147
explosives 9
length and slope of trommel on capacity 378
slope of trommel on capacity 377
speed on capacity of a trommel 379
strength and specific gravity of rocks on power used 373
temperature on amalgamation 766
at Mill 106 1640
weathering on flotation process results at Mill 130 1724
on capacity of trommels of varying the diameter 379
Efficiency of classifier jig at Mill 120 1452
cocoa matting tables at Mill 111 1657
gravity stamps 219
Hancock jig, quality of work 1441
labor, effect on costs 1127
pumps 868
rolls 109
rope transmission 1095
sand wheel 1587
steam stamps 131, 133
and gravity stamps compared 134
tube mill 1292
water wheels 1089, 1090
Egleston, T., Allouez and Atlantic mines 1174
amalgamating pans 290, 291
amalgamation 787
arrastra 289
ball mills 293
Ball stamp 142
Blake breaker 57, 58
edge runners 295
estimate by, of wear of iron in pans 249
Gates breaker 56
gravity stamps 223, 224, 225
hand picking at the Allouez Copper Mine, Lake Superior 492
Huntington mill 296
hydraulicking 1173
jigs at Tombstone stamp mill 639
Krom rolls 109, 110
Lowe's mill 294
metallurgy xix
non-amalgamation 1174
on breakers 56, 57, 58
mortars 164, 165
silver amalgamation 1039
stamp frames 153
wear of amalgamating pans 249
stamping and washing at the Allouez mine 142
Tustin mill 294
Ehmke's ball mill 293
Eich, L., on impurities in amalgam 251
Eissler, M., amalgamating pans 290
silver 1173
amalgamation 787
Blake breaker 56
Dodge and Krom breakers 56
breakers 56
Cyclops mill 294
definition of slimes 1398
Gates and Krom rolls 109
breaker 56
gold stamp milling 1173
gravity stamp clutches 198
stamps 223
Green's movable sieve jig 639
Grüson ball mill 293
Harz and Collom jigs 639
Huntington mill 297
Krom jig 837
metallurgy of gold xix
silver xix
mortar linings 166
Eissler, M., pointed boxes, *spitzlutte*, cone classifier .. 476
silver amalgamation 1039
stamp frames 153
El Bote mill, Zacatecas, Mexico 1408
El Callao mill, cost of milling at 1127
Electrical driving of stamp batteries 2012
Electric Controller & Supply Company 1532
cobbing magnet at Mill 164 1850
current. See also Power.
for electroplating copper plates 755
on amalgamated plates 740, 752
lights 1100
for hand picking 481
power in mills. See Individual Mills in Chapter XX.
for mills 1089, 1091
plant at Mill 177 1895
separator, discussion of various 2026
Electricity *versus* steam as a motive power 1927
Electro-conductivity 1611
Electrolytes for slime settling, relative values of 1414
Electrolytic action on amalgamated plates 749
Electromagnet, hand 812
Electromagnetic and electrostatic separators, general discussions of. W. M. Johnson 2025
separator, Ball-Norton 1568
Ding 1568
Eriksson's 1529
Forsgren's 1538
Electromagnets, design of 790
Electroplating copper plates 754
Electrostatic and electromagnetic separators, general discussion of. W. M. Johnson 2025
separation 2030
article on 2026
at Mill 151 1804
of copper ore, discussion of. W. G. Swart .. 2026
various zinc blendes 1550
principles of 1199, 1549
separator 1549
Blake-Morscher electrical ore separator 1550
description of a generator for 2027
discussion of principle of. J. M. McClave .. 2026
Huff 1551
lists of good and poor conducting minerals .. 1550
Sutton-Steele 1568
Electrum, specific gravity of 1189
Elevating conveyor 861
wheels 864
Elevator boot as unwatering box 450
Elevators 862, 1586
For position see Individual Mills in Chapter XX.
at mills .. 1661, 1663, 1667, 1681, 1685, 1689, 1690, 1691, 1693, 1700, 1702, 1703, 1707, 1710, 1711, 1715, 1725, 1727, 1728, 1729, 1737, 1738, 1742, 1743, 1749, 1750, 1752, 1753, 1755, 1756, 1759, 1760, 1762, 1763, 1769, 1771, 1772, 1774, 1792, 1793, 1804, 1818, 1819, 1829, 1837, 1839, 1840, 1842, 1843, 1844, 1845, 1846, 1847, 1853, 1854, 1855, 1857, 1858, 1866, 1867, 1869, 1879, 1877, 1880, 1883, 1888, 1889, 1890, 1898, 1910, 1928, 1929, 1930
bibliography for 884
bucket 862
centrifugal sand pump 1588
details regarding running of. E. S. Wiard 2032
displacement pumps 1589
for dredges 1012
tailings 1113
in mills, use of 1086
John A. Traylor centrifugal pumps 1588
Lancaster rotary pumps 1589
or raff wheel for Wilfley table 1468
platform 864
sand pumps 1587
wheels 1586
wheel agitator used for 780
Wilfley 2031
Elkton mine, ore washing at 1616
Ellenbecker spring stamp 141
table 681
Elliott coal washer and Hardy dust extractor. E. Greaves 2051
Elliptical gear for jigs 536
mechanism for bumping tables 681
Ellis concentrator 1499
vanner 657
Elmore, A. S., flotation process 1555, 2028, 2035
oil concentration mill 1070, 1072, 1117
process 831, 1183, 2026
advantages of the 2026

Elmore, oil process in Cornwall. M. Baldauf 2047
Ore Concentrating Company..... 1993
plant, London, England 2035
process 1155
at Dolcoath. E. Walker 2039
the Tywarnhaile copper mine, Cornwall, England 2038
C. M. Rolker..... 2025
E. Walker 1569
failure of 2029
for Slocan ores 2025
in diamond washing 2026
Rossland, failure of 2025
saves 93 percent. of values 2029
statement on the. F. H. Claudet..... 2025
testing for 1993
tests on, at Glasdir mine, Wales..... 832
results of 2049
vacuum flotation process, description of the. A. S. Elmore.....1569, 2027
E. Walker 2027
oil process 1556, 2026, 2030
at Cornwall, England 1559
Mill 141 1765
consumption of oil 1560
description of the. F. H. Prentiss 2027
in Sweden 1560
El Oro cast-iron ribbed liners for tube mills at Mill 118..... 1677
district, Mexico, cost of producing gold in 1980, 1981
lining for tube mills..... 1340
Mining and Railway Company 1676
tube mill lining.....2014, 2015, 2016
El Paso Foundry rolls at Mill 151 1803
smelter, sampling at 884
El Potrerito mill..... 1665
El Silencio mill, fineness of amalgam in 763
Elspass mill 1280, 1323
Elutriation.....830, 1611
for emery 1079
use made of, in mills..... 889
Embrey vanner 653
testing..... 1171
Emery mill at Mill 186..... 1918
ore, mill for..... 1079
separated by magnets 790
washing 333
wheel for truing roll shells.....70, 1243
Emmons, S. F., gold stamp mills in Maryland 1175
and G. F. Becker, amalgamating pans 291
amalgamation 789
arrastra 290
edge runners 295
Empire mill..... xxvii, 1020
Plattesville, Wisconsin..... 2038
stamp mill 1184
Zinc Company 1759
mill 907
Ems 1102
Linkenbach V-box classifier at 421
mill at.....1087, 1135
number of sieves on jigs at 590
sieve scale at 367
Enargite, specific gravity of 1189
End-bump group of tables..... 1497
tables 667, 680, 1464
comparison with side-bump 682
Ellenbecker table 681
Gilpin County concentrator..... 680
Golden Gate concentrator 681
Imlay 681
Endless belt 1094
conveyors 859
chain conveyor 860
End-shake vanners 652, 1165, 1500
Akens and Evans slimer 1500
Embrey concentrator..... 653
for testing 1153
Triumph concentrator..... 652
versus side-shake 655
vibration in 658
Woodbury 655
Energy of gravity stamps 219
steam stamps 133
Engelmann, H., air *versus* water jigging, Utsch side plunger jig..... 640
Engines used in mills. See Individual Mills in Chapter XX.
in mills..... 1091
Engis, air classifier at 817
classifier 475, 477
English standard gauge 1194
steel for shoes and dies 185
system of jigging 1463
Enterprise mill, Plattesville, Wisconsin 2038
E. P. Allis Company ..72, 76, 111, 181, 187, 189, 194, 197, 228, 243, 245
batea made by 683
dies made by 245
edge runner made by 270
inside plates 178
muller and shoes made by 246
power for 5-foot pans estimated by 249
shoe and die channels in amalgamating pans by 247
weights of spider and driving cone made by. 247
Epidote, hindered-settling test on 617, 621
settling velocity of 466, 469
specific gravity of 1189
Equipment of gold mills. G. A. Denny..... 2012
Equivalents of weights and measures..... 1187
Erbium, atomic weight of 1188
Erecting mills, costs of 1124, 1939
Eriksson's electromagnetic separator 1529
Ernst, C. von, separator at Monteponi 836
Errors of small tests 1168
Erythrite, specific gravity of 1189
Eschka, A., separation at Przibram 836
Espiritu Santo mill at Cana, Darien. E. R. Woakes 2033
plates in 788
Essential qualities of classifiers..... 389
Essentials of a good breaker..... 49
Esser concentrator 2023
Estimates on cost of hand picking..... 487
Eureka Hill mill..... xxviii, 228, 1041, 1184
W. McDermott..... 2039
stamps 228
wear of amalgamating pans 249
rubber 770, 776
Utah, mill at 926, 1041
Europe, hand picking in..... 486
milling in 1173
mills in.....937, 1088
Eustis, Canada, hammers used 10
mill at 904
Mining Company 1888
mill .....xxv, 904
W. E. C. and H. M. Howe, magnetic process for nickel 833
Evans classifier.....393, 476
at mills.....1838, 1839, 1844, 1845
Collom, and Woodbury jigs, capacities compared..... 1448
G. H., hydraulicking 1006
hydraulic mining .....xix, 1173
hydraulic classifier, details of in mills 395
ideas on jigging 2022
jig 517, 524
at mills 1837, 1843, 1844, 1845
size of sieve and plunger 529
water used by, compared with that used by Hancock jig 1442
round tables at Mill 162..... 1846
short stroke jig at Great Falls..... 2021
slime tables at Mill 177 1893
table 689
used in mills..... 696
Waddell Chili mills at Mill 160 1833
W. J., slope of launder in mill of Atlantic Copper Mining Company 873
Evrard, M., coal jigs 641
mechanical discharge for jig tailings 588
Evrard's coal jig..... 642
jig 643
Examination for minerals 1162
Excavating expenses 1123
Excavator, the Blaisdell 1600
Excelsior breaker 60
Exhaust fans 1099
steam for heating 1098
Expanded metal riffles 703, 722, 1007, 1008, 1012
Expanding cone wash trommel 334
Expense accounts 1122
Experimental plant at Mill 182..... 1911
study 1120
Experiments on film sizing..... 707
with launders, Blue's..... 1594
Overstrom's..... 5921
Explosives, effect of on rock 9

Extent of crushing desired 303
Extraction at Meyer & Charlton mill, South Africa .. 1647
average, percentage made in various districts, table of 1612
in mills..1618, 1622, 1626, 1639, 1648, 1649, 1657, 1659, 1660, 1675, 1678, 1696, 1705, 1718, 1721, 1723, 1724, 1726, 1730, 1745, 1767, 1771, 1780, 1782, 1791, 1815, 1816, 1817, 1820, 1826, 1827, 1830, 1834, 1849, 1856, 1865, 1870, 1871, 1881, 1887, 1891, 1897, 1899, 1900, 1906, 1907, 1908, 1909, 1912, 1914, 1916, 1920, 1922
of metals and minerals by Elmore process 1559
percentage of. See Individual Mills in Chapter XX.
percentage of 1115
Extractions and costs 1939
in S. Africa increased by fine grinding 2014
western Chihuahua 1665
percentage of in various mills 1932

F

Faber du Faure furnaces at Mill 117 1674
E., washing of graphite for lead pencils 1176
Face of rolls 83
Fairbanks, Morse Company, Elspass mill 1323
Nissen stamps 1278
False bottoms 180
for stamps 180
Falun, Sweden, mill at 1136, 1177
stamps at 225
Fan for air blast 816
shaped apron for distributing 857
Fans at Mill 186 ..... 1917, 1918
for dust 883
Farbaky, Stefan, comparison between Wetherill separator and wet jigs 836, 2030
Fargo guide for gravity stamps 154, 155
Farrel-Bacon breaker at Mill 175 ..... 1888, 1889
-Blake breaker at mills .1221, 1690, 1749, 1769, 1868
life of wearing parts at Mill 139 1221
duplex breaker, table of sizes of 21
Foundry and Machine Company 52, 59
Blake breaker 14, 21
jaw movements 34
breakers 59
cost of breaking ore 1223
information on Blake breakers 1223
roll speeds 87
Fastening plates to table 735
Father de Smet gold stamp mill 1108
mill 1174
breaker in 57
Eureka rubber in 777
false bottoms in mortar 180
grizzlies in 385
mortar liners 166
mortars 164, 165
plates in 787
shoes in 181
stamp screens 169
stamps in 224
wear of shoes and dies in 183
Faults and features of rolls 1229
Faust, H., on jig capacity 602
jig, slope of sieves on 548
width of sieve 591
Fawcett, W., testing of black sands 2048
Fawns, S., milling at Mt. Bischof, Tasmania 2037
Feather River, California, dredging on 1008, 1184
Federal Lead Company 1690
Mining and Smelting Company 1685
Morning mill 1687
shaking screen at Mill 124 1694
Feed arrangements on slime tables 688
box for jigs 549
Wilfley table 673, 1468
classified, for Wilfley table 1473
cone for trommels 358
for canvas tables 700, 701
classifiers 389, 442, 444
Freid dry-process separator 1554
Gilpin County bumping table 681
gravity stamps 207
Huff electrostatic separators 1552, 1553
jigs 552
kieves 726
riffle tables 679
rolls 1224
slime tables 720
stamps 1224
Feed for stamps, quarter inch 2012
trommels 352
vanners 658
and slime tables compared 691, 692
proper consistency of 1404
Wilfley tables, proper consistency of 1404
free and choke feed for rolls compared 1229
maximum size for Wetherill magnetic separator 1525
natural, on Wilfley table 1471
opening in mortars 166
openings for tube mills 1287
sized, for Wilfley table 1473
versus classified feed for Wilfley table 1478
size of feed to Ball-Norton magnetic separators.. 1528
in gravity stamps 207
treated by De Bavay process 1562
Ferraris magnetic separator 1525
sole for classifiers 434
spitzlutte 423
suited for Wilfley slimer 1505
to rolls 63
Wilfley table 674
water for New Standard concentrator 1479
Feeders. See Individual Mills in Chapter XX.
Feeders 853, 1578
at Mill 125 1700
bibliography for 884
Challenge feeder 1578
type 1580
for Argall driers 1600
clayey ore 71
gravity stamps 199
Huntington mill 278
movable sieve jigs 500
rolls 71
small steam stamps 137
tube mills 1287
special. F. J. Nagel 2016
Woodbury vanners 655
Hoscur ore 2032
improved swing ore. P. J. Johnson 2032
in the mills 856
Musterschutz 884
Pepler ore. D. J. Pepler 2032
Perfection ore 1578, 1609
Perfect ore 1609
push feeder at Mill 113 1581
shaking, at Mill 124 1691
Simplex ore feeder 1578
Feeding affecting capacity of jigs 601
arrangements of stamps 128
by machine 1115
gravity stamps 207
Huntington mills 1314
jigs 548
magnetic separator 802
of slime tables 684, 689
trommels 357
ore bins 843
tube mills 1288
Feldspars, decomposition of. A. S. Cushman and P. Hubbard 1418
for beds on coal jigs 574
Feldtmann, W., definition of slimes 1398
Fenner, C. M., on gold and silver in amalgam 763
Ferguson, H. T., Dingey mill 293
Husband pneumatic stamps 143
rolls in Cornwall 111
runs in Cornwall for tin 478
tin dressing in Cornwall 1182
Ferrand, P., amalgamating pans at Ouro Preto, Brazil 291
amalgamation at Ouro Preto, Brazil 1173
California *versus* Brazilian stamps at Ouro Preto, Brazil 227
gold mill at Ouro Preto, Brazil 1182
L'Or á Minas Geraes xix
riffle sluice 727
Ferraris adjustable eccentric for jigs 532
ball mill 1280, 1299, 1323
at Mill 137 1300
capacities of 1300
table of sizes, power, weights, etc. 1300
W. R. Ingalls 2014
belt table 698
classifier 400, 478, 1369
E., calamine plant at Monteponi 2040
capacity of jigs 597
concentration at Monteponi 1185
dressing zinc ores at Monteponi 1185

Ferraris, E., Ferraris adjustable eccentric 643
belt tables 729
classifier 478
magnetic separator at Monteponi 836
shaking screen 386
Harz jigs at Monteponi 643
magnetic separation at Monteponi 2046
mechanical preparation of ore in Sardinia ... 1568
riddle 385
separation at Monteponi 1185
separator at Monteponi 836
velocity of particles falling in water 477
hand screen 1360
intermediate jig 539, 540, 584
jig 522
magnetic separator 799, 1525
at mills 1525, 1741
description of the 2027
drum type 1528
method of removing tailings 587
shaking screen 342, 386, 1347
at Mill 137 1347
stay box for jig discharges 585
tables 1154, 1490
at mills 1659, 1740, 1741, 1782, 1785, 1786, 1914
tables of sizes, capacities, speeds, power, weights and water consumption 1490
versus jigs. M. Lenicque 2021
waving screen. C. W. Wright 2019
at Mill 137 ..... 1739, 1740, 1741
wet ball mill at Mill 137 1740
Ferreira mill, details of stamps 221
mine, saving by hand picking 487
weight of ore at 1160, 1191
Ferro-aluminum for roll shells 68
shoes and dies 184
Ferrous sulphate used in dressing plates 757
Fiber asbestos 1080
Fiberizer at Mill 186 1917
Film gauge 1159
on a circular slime table, thickness of 695
sizers 1464
sizing, results of tests 719
tables 685, 1506
Acme table 1506
bibliography for 727
buddles 704
building tables 704
continuous surface tables 686
depth of bed 1510
intermittent surface tables 700
investigation of 707
principle of 644
revolving circular convex slime tables 686
surface tables 685
use made of, in mills 889
thickness of on amalgamated plates 746
on slime tables 695, 697
Films on canvas tables, thickness of 702
Filter 879
bins 1570
at Mill 171 1870
boxes for jig concentrates 586
in cyanide plants 1107
press at mills 1628, 1630, 1641, 1642, 1678
Filtering mercury 786
slimes 1160
Filters in settling tanks 458
Final conclusions on crushing 62
hindered settling and suction 631
separators 480
Financial standing 1124
Findley, O. P. 1408
mill of the Cananea Con. Copper Co., Mexico 2045
Fine concentrates, definition of 495
objections to 1053
concentration test 1165
crushing by breakers 54
department at Mill 152 1806
gravity stamps used for 314
mills 1004
grains investigation on rate of settling 473
grinding. A. W. Warwick 1340
importance of. F. C. Brown 1323
in the tube mill. A. W. Warwick 2015
limit of screening 369
sand and slime concentrators 644, 700
classification of 1464
kieves 726
Fine sand and slime concentrators, riffles 720
concentrators, Wilfley table 1465
slimes, effect of 892
Fineness of bullion 749, 763, 785
crushing desired 303
gold and silver in amalgam 762
retort residue 783
Fines for miners 1115
in product from Wilfley roasting furnace sink in water 1547
Finest size jigged 606
to which middlings are re-crushed in the mills 1119
Finger bars for gravity stamps 199
lever-operated, for gravity stamps 1273
geared rolls 77, 78
Finish angles in film sizing tests 715
Finishing machines 318
Finland, magnetic separation in 804
Finlay, J. R., milling in the Cœur d'Alene 2033, 2037
mining in Cœur d'Alene, Idaho 1922
on costs 1927
Fire and water for breaking rock 9
assay of gold ore 1166
tube boilers 1090
water for 1106
Fischer, formula for speed of revolution of tube mills 1337
George K., Robinson riffle 729
Herman, operations of tube and ball mills 1340
Fisher's steam stamp 142
Fitzgerald shaking screen-launders at Mill 142 1767
Fixed circular convex slime tables 689
Linkenbach fixed conical table 689
Roberts table 691
sieve hand jigs 519
jigs 494, 507, 1444
classifier jigs 1447
Hodge 1446
Krupp Harz jig 1446
New Century 1444
Richards' pulsator jig 1453
Woodbury jig 1447
Flange, Brownell 647
for amalgamating pan 244
Flanged rolls 110
at Mill 130 1720
Flash point of oils 1098
Flat grains, action of 892
on slime tables 694
in middlings 1121
River district, cost of producing lead in 1971
Lead Company, disc conveyor at Mill 1 of ... 1583
mill ..... xxvi, 920
Missouri, mill at 917, 920, 1089
site for mills 1085
Fleming dewatering wheel 1609
at mills 1590, 1725
J. D., Fleming dewatering wheel 1590
Flint pebbles for grinding 267
Flints for tube mills 1288
Floors for draining concentrates 1112
drying 880, 882
hand picking 485, 486
mills 1088
receiving ore 842
sampling 844
steam stamps 128
weathering 830
diamond ground 1080
slope of 1089
Florence, Colo., rolls at 111
Florida, phosphate mills in 895
Flotation at Golconda, Nevada, water. W. A. Root 2046
of clay 1075
process 1555
at Broken Hills 2038
acid 2035
F. H. Jackson 2045
Mill 130 ..... 1719, 1721
data on. C. Blömeke 2030
De Bavay 1555, 1562, 1568
Delprat 1555, 1561, 1568
at Mill 129 1718
description of different 2026
economic side of the. W. G. Swart 2029
Elmore 1555, 2029
E. Walker 1569
vacuum-oil process 1556
history of the. C. Gopner 2028
list of minerals floated by 1555

Flotation proccss, Macquisten 1555
Macquisten's Coates tubes..... 5638
magnetic separation *versus.* D. Clark 1561
Minerals Separation Company..... 1560
or Catermole 1555
Potter 1555, 1561, 1568
principle of 1199
salt cake. Pittman 2028
theory of the 1555
G. Hoagland 2027
used at Broken Hill, acid 2037
Van Meter testing apparatus 1992
vats at mills 1718, 1722
versus magnetic process for zinc ores. E. Laughton 2029
"Flouring" of mercury..... 751
Flow in launders 876
of sand and water in launders ..1592, 1593, 1594, 1595
water in launders..... 884
Flues in boilers..... 1091
Flume for water 1105
Fluorine, atomic weight of 1188
Fluorite, specific gravity of 1189
Fluorspar, decrepitation of..... 829
separated by Hooper air jig..... 822
Fluxes for melting..... 784
F. M. Davis Iron Works Company.....72, 87, 194
Folsom dredge of 140,000 cubic yards capacity 2044
Fonseca on impurities in amalgam 251
Foot, equivalents of 1187
A. D., battery screen..... 1270
North Star mill 2045
Mines Company..... 1925
Foote, A. E., glass classifier..... 1146
Foot-pounds, equivalents of 1188
Force required on rolls 74
Forces, table of value of, acting at different angles in rolls 94
Foreign mills, sites of 1086
Forged-steel roll shells at Mill 141 .....1760, 1761, 1762
Forms of frames for gravity stamps 156
launders 876
riffles 721
Formula for centrifugal force 827
in trommels 374
free settling 471, 473
magnetic lines of force 793
magnets 794
path of particle in trommel 375
settling tanks 455
Formulæ, Blue's formulæ for flow of sand and water in launders 1594
Forsgren electromagnetic separator 1538, 1815, 2038
Forster breaker.....57, 60
of jaw type 25
plan of 28
table of wear, in Mill 67 28
Fort Scott Foundry & Machine Co., rolls..... 76
Machine Works, rolls 111
Fortuna mill, amalgamatcd plates in 745, 762
breakage of stamp stems 188
order of drop 215
wear of shoes and dies in 183
weight of stamps in 190
Foss, rohrmühle..... 293
Foster, C. Le N. 1173
Ball & Leavitt stamps 142
belt tables, Cornish frames, buddles, percussion tables, kieves 727
Blake, Baxter, Marsden, Hall, Lester, Dodge breakers 56
Carr disintegrator 298
Chase, Conkling, Edison, Hoffman, Kessler, Lovett-Finney, Ball-Norton, Buchanan, Friedrichssegen, King's, Wenstrom magnetic separators 832
concentration of miscellaneous materials..... 1069
Cornish rolls, Krom rolls 109
Cyclone pulverizer 298
double-cone classifiers 427
edge runners 295
Gates breaker 56
gravity stamps 223
Grüson ball mill..... 293
hammers and breakers 56
for breaking 11
hand breaking and picking, picking tables .. 492
Harz jig, Heberwäsche 639
Huntington mill 297
Husband and Patterson stamps 143
Foster, C. Le N., Jordan's centrifugal grinder 295
Krom jig, Clarkson-Stanfield, Pape-Henneberg machines..... 837
limit of sizes jigged 605, 606
pointed boxes, cone classifier, Lockhart's classifier, siphon separator 476
settling tube 621
Sturtevant mill 298
text-book, ore and stone mining xix
Vapart disintegrator 299
washing pits, pans, and trommels..... 334
Foster-Coolidge automatic sampler 2032
W., on concentrating tin ore 288
Foundation for arrastra 238
gravity stamps 145
Linkenbach slime table..... 690
mills 1088
Wilfley table 1465
frame for amalgamating pan 241
Foundations and mortar beds for stamps, table of .. 118
at Grass Valley, mortar 2012
for Huntington mills 1313
mills 1125
Nordberg steam stamp 1247
stamp batteries 2011
mills, concrete..... 2013
steam stamps 114
tube mills 1286
in stamp mill, masonry 2012
mortar. W. H. Washburn 2012
stamp mill. A. W. Warwick 2044
Foundry for mill 1088
Four mineral separation on jigs 590
Fowle, J. C., Buchanan and Wenstrom separators at Lake Superior..... 833
magnetic plant at Michigamme mine, Lake Superior 1175
Fractional selection for sampling 844
Fracture affecting separation 889
effect of, in dressing ores 3
Fraenkel, A..... 476
Frame, Boss cantilever frame for gravity stamps ... 1272
for slime table 687
steam stamps 118
Wilfley table tilting frame 1467
Frames 1464, 1507
Cornish 704
for amalgamated plates..... 733
Frue vanner 645
gravity stamps 152, 156
jigs 507, 522
screens 176
tin ores..... 1083
vanners 653
Wilfley tables 671
new Dimmick patent slime table 1507
of iron for stamps 158
rolls 63
rag 1507
Framing of mills..... 1088
France, mills in 1179
Francfort, Italy, mill at 1182
Francou jig 519, 643
Franklin Furnace, New Jersey, Edison drier at..... 1600
mill at 1060, 1181
Wetherill magnetic separators and operating attendance required at 1525
J., Huntington mill, Idaho mine, Alabama 1174
shaking plates and blankets at the Idaho mine, Alabama..... 787
Mining Co..... 1181
mill ..... xxvii, 993, 1017
New Jersey, magnetic separation at 835
Franklinite, magnetic separation of 805, 807, 808
separated by magnets 790
specific gravity of 1189
Fraser and Chalmers.....16, 41, 79, 172, 280
agitators made by 780
amalgamating pan..240, 243, 244, 245, 246, 247, 249
classifier 416
Corliss engine 987, 1044, 1046
deep pocket classifier..... 477
details of cylinder water used, and capacity.. 126
dial cocks for gravity stamps 199
dies made by 245
estimate of power for 5-foot pans 249
gauges 1194
geared rolls 78
Heberli mill.....257, 258
Huntington mill..... 280

Fraser and Chalmers on amalgamators 780
attaching screens to trommels 356
capacity of rolls 102
classifying vanner feed 658
design of cams 196
mortar bolts 150
power for jigs 603
stamps 204
steam stamps 131
punched screens 170
screen gauge 173
shoe shanks 181
stamp bosses 187
clearance 195
stems 187
tappets 189
thickness of screen plate 372
vanner adjustments 659
vanners 655, 662, 663
wearing parts of breakers 48
power for rolls 97
settlers 779
trommels 357
rolls 76
at Mill 136 ..... 1737, 1738
Mill 175 1890
roll speeds 87
sample grinder 257
sand wheel 1587
settlers 777
spindle breaker wearing parts 47
stamp frames 153
standard rolls 2010
cam 197
steam stamp .. 114, 116, 118, 119, 120, 121, 122, 123, 126, 127, 128, 131, 133
two-stamp mill 209
weights of spider and driving cone made by .. 247
Frayer centrifugal water-lined pump at Mill 159 ... 1829
Frecheville, R. J., Cornish tin dressing 1183
Free and choke feed for rolls, comparison of 1229
crushing 98, 313
milling test 1166
settling affected by natural properties of minerals 464
and hindered settling defined 464
classification by 474
classifiers, tubular 1381
concentration by 475
deep-pocket classifiers 1376
defined 464, 1421
formula 471, 473
general principles 464
investigated by tubular classifier 469
ratio free to hindered settling 1430
ratios 469, 471, 1426
of quartz and galena 1426
table of 1426
sorting by 489
tube investigation 465
use made of, in mills 889
velocities 476
of mineral particles 1421
versus hindered settling 1431
Freezing of stone, effect on strength 301
point of mercury 730
Freiberg, Bilharz jig at 503
oblong movable sieve power jig used at 503
classifier at 413
hand picking at 486, 492
mill at 1087, 1099, 1102, 1135
bibliography for 297
Saxony, mill at 958, 1174, 1177, 1179, 1183
screens at 364, 365
sieve scale at 367
skimming jigs at 576
Stein, Bilharz and Luhrig tables at 670
water used on bumping tables at 670
Freid Engineering Company, gravity dry-process separator 1553, 1554, 2027
size of feed for 1554
Freight, cost of 1126
French Rand Mining Company mill. T. Dupont .. 2039
Frenier, J. H., & Son, spiral sand pump 870
sand pumps 1588
at mills .. 1630, 1708, 1755, 1756, 1761, 1769, 1779, 1811, 1812, 1830, 1885, 1886
Friability of minerals, affected by calcining 9
separation by 830
under a blow 1611
Friability, use made of, in mills 891
Friction 1097
angle in trommels 374
clutches 1096, 1606
for gravity stamps 198
the H. W. Caldwell and Son Company friction clutch 1606
in jigs 602
launders 876
roll journals 95
rolls, how reduced 96
losses 1038
of breakers 54
cams 194
gravity stamps 219
process of concentration. O. Witt 2030
ore dressing 2028
Friedeberg mill 235
Friedensville, jigs at 642
movable sieve jig at 506
Pennsylvania, mill at 903, 1178
Zinc Co., mill ..... xxv, 903
Friedrich Krupp Grüsonwerk 260
amalgam press 1518
amalgamating tables 1514
box-traps 1516
ball mill 260
breaker jaws 23
Erikssons' electromagnetic separator 1529
Forsgren magnetic separator 1539
Krupp Harz jig 1446
high speed rolls 1244
mill for five mineral separation 591
picking tables 1435
spitzlutten 1382
wash trommel 1341
Friedrichssegen, calcining furnace at 1546
classifiers at 477, 479
distributing tanks at 450
Heberli magnetic separator 799
magnetic separator at 799, 833, 834
mines, Sautter magnet at 798
picking at 481, 487
roasting for magnetism at 815
sieve scale at 367
Frisbee Lucop mill 234, 267
mill, bibliography for 294
Frisco mill, Utah, Paddock jigs at 822
Mining Company 1737
Utah, mill at 1015
Paddock jig at 839
Fritsch rolls 2010
Fröbel's grinding mill 232
mill, bibliography for 291
Fröding separator 2028
in Sweden, data on 2030
Froitzheim's spring stamp 143
Frongoch mine, double cone classifier at 427
Frue vanners. See also Vanners.
vanners 645, 1499
at mills .. 1625, 1627, 1662, 1689, 1694, 1695, 1703, 1704, 1711, 1712, 1755, 1844, 1865, 1868, 1870, 1880, 1881, 1884, 1929, 1930
capacity of 662
description of 645
for testing 1153
in Cornwall. R. A. Thomas 2022
modification of 651
testing 1171
vibrations of 658
water used in 659
without previous classification, use of 2023
Fuel. See also Wood and Coal.
burned in driers 880
consumption by Wilfley roasting furnace 1548
required by roasting furnace at Mill 138 1747
rotary drier at Mill 186 1917
Fuller mines, gasoline engines at 1091
Full teeter velocities of quartz and galena, table of .. 1430, 1431
Fulton, C. H., cyaniding in the Black Hills 2033
the history of the Homestake mills 2041
Engineering Works, clean-up barrel 264
Iron Works, breaker of Blake type 22
distributor at Mill 126 1707
mechanical batea 683
rolls 76
Furman, H. van F., amalgam 788
amalgamated plates 735
amalgamating pan 291

Furman, H. van F., amalgamation and concentration for gold and silver ... 1173
and S. R. Krom, pneumatic concentration .. 838
arrastra ... 290
Blake, Dodge, Comet, Schranz breakers 58
breakers ... 58
Bryan mill ... 295
capacity of jigs ... 597
clean-up pan ... 291
Crawford mill ... 295
cyaniding ... 1167
Cyclops mill ... 294
edge runners ... 295
gold amalgamation ... 1179
gravity stamps ... 225
Griffin roller mill ... 297
Huntington mill ... 297
jigs ... 642
material for jig screens ... 545
Morning mill, Mullan, Idaho, and Hecla mill, Glendale, Montana ... 1179
Paddock jig at Frisco, Utah ... 839
practical assaying ... xix
Roger's rolls ... 110
sample grinder ... 292
spitzkasten, Frazer & Chalmers deep pocket classifier, cone classifier, made by Colorado Iron Works, Carkeek classifier ... 477
testing of gold ores ... 2048
Furnace for drying ... 880
heating for decrepitation ... 829
melting ... 784
roasting at mills ... 1747, 1862
for magnetism ... 814, 815
Furnaces, roasting ... 1545
Future of ore dressing ... 1119

G

Gaetzschmann, M. F., amalgamating pans ... 290
amalgamators ... 787
arrastra ... 289
Aufbereitung ... xix
Ball and Wilson stamps ... 142
ball mills ... 293
Bogardus mill ... 292
Carr disintegrator ... 298
classifiers ... 476
cone mill ... 292
crushing machines ... 315
edge runners ... 295
fixed and movable sieve jigs ... 639
general milling ... 1173
gravity stamps ... 223
grist mill or buhrstone mill ... 291
hammers, breakers, roasting for friability ... 56
for breaking ... 11
hand picking ... 492
Hughes pneumatic stamp ... 143
Nicholas pulverizer ... 292
pneumatic concentration ... 837
riddles and trommels ... 384
roll speeds ... 87
schleudermühle ... 299
sledging, spalling, and cobbing hammers 56
slime tables, bumping tables, buddles ... 727
trough washers and wash trommels ... 334
various obsolete breakers ... 56
Whelpley & Storer pulverizer ... 299
Gagnon ore, sizing test on jig tailings ... 607
Gahnite, specific gravity of ... 1189
Galena and quartz, jig tests on ... 620
used for film sizing tests ... 707
blende ore, Missouri, sizing tests on ... 303
treated at Diepenlinchen ... 670
crushed by rolls ... 62
cost of hand picking of ... 488
extraction plant at Mill 130 ... 1720
free-settling velocity ... 471
hindered-settling tests on ... 612, 617
in dolomite, crushed in Mill 25 ... 47, 98
in Missouri, treatment of. O. M. Bilharz 2034
Iron Works, Blake breaker at Mill 148 ... 1792
Kansas, mill at ... 901, 902, 1179
ore, weight of ... 1190
pulsion jig test on ... 624
roasting furnace ... 1548
separation from quartz ... 720
settling velocity of ... 466, 469
specific gravity of ... 1189
Galena-sphalerite ores at Broken Hill, separation of. 1611
with limestone, crushed by rolls ... 69
Galland coal breaker ... 2009
Gallium, atomic weight of ... 1188
Gallon ... 1187
equivalents of ... 1187
of water ... 1187
Galvanic couple used on amalgamated plates ... 752
Galvanized iron classifiers ... 1144
Gandy belting for elevators ... 862
canvas belts ... 1094
elevator belt at Mill 114 ... 1663
Gangue minerals in mills. See Individual Mills in Chapter XX.
Gantry clam shells for loading concentrates at Mill 167 ... 1858
Garde, A. G., New Century magnetic separator ... 1542
Gardiner breaker ... 57
Garfield Chili mill ... 1305
at Mill 167 ... 1305, 1858
screen analysis of product ... 1307
Smelting Company, Silver Lake mill ... 1771
Garland wire-rope disc conveyor at Mill 124 ... 1695
Garnet rock, weathering of ... 831
separated by magnets ... 790
specific gravity of ... 1189
treated on Hooper air jig ... 505, 824
Garn, M. ... 297
Gartrell, H. W., effect of varying speed on percent. of undersize in crushing ... 2017
Gas engines ... 1091
power plant at Mill 172 ... 1874
Gasoline engines ... 1091
Gassaway, A. D., plates, riffles, and sluice plates at the Magalia drift mine ... 789
Gate and dam discharges, center discharges ... 582
for jigs ... 577
height of dam ... 579
gate ... 578
on jigs ... 553
ratio of height of gate to size of feed ... 578
side discharge ... 580
tail discharges ... 581
Gates ... 138, 139
all iron frame revolving screen ... 1353
ball mill ... 1280, 1300, 2014, 2017
table of sizes, capacities, power, weights, etc. 1301
breakers ... 55–60
action of ... 39
at mills .. 1635, 1661, 1706, 1710, 1713, 1716, 1727, 1768, 1817, 1818, 1821, 1828, 1853, 1857
compared with McCully ... 45
description ... 36
details of ... 38
on "choke crushing" ... 48
with short head and concaves ... 1208
at Mill 165 ... 1851
canvas plant ... 1017, 1184
of the Kennedy Mining and Milling Company mill ... xxviii, 1037
cast-iron head center for gyrating breakers ... 1220
classifier ... 1369
economic rolls ... 81
feeder ... 136, 854
for rolls ... 71
for classifiers ... 406
ore bins ... 843
G. G. ... 1369
classifier ... 418
end shake vanner ... 653
patent vanner belt ... 650
gunlock manganese-steel mantles for gyratory breakers ... 1220
hydraulic classifier ... 477
Iron Works, beveled rolls ... 71
Blake breaker ... 23
breaker ... 23
jaw movements ... 34
capacity of jigs ... 597
comparative tests of jaw and spindle breakers ... 53
estimate of cost of crushing ... 51
Lowry National breaker ... 45
on design of cams ... 196
friction in rolls ... 97
wearing parts of breakers ... 48
power for jigs ... 603
rolls ... 73
roll speeds ... 87
springs ... 74

Gates Iron Works, Tremain steam stamp 136
vanner 651
in mercury traps 773
wells 768
on Tremain stamp 139
P. W. viii
rolls 109, 111
at mills 1707, 1710
rule for power used in crushing 309
tube mill 1280, 1296
vanner 658
Gauges 223, 1097, 1174
for brass and iron wire 1999
screens 171, 172
water films 1159
wire and plate 1194
Gayet, argentiferous galena at Villefort, France 1178
Castelnau belt table 728
Geared rolls 75
at Mill 183 1913
Gearing 1096
for gravity stamps 198
Gears for amalgamating pans 248
trommels 356
sand wheels 865
Gebrüder Sulzer centrifugal pump at Mill 118 1678
Geddes & Bertrand mill, sizing test on crushed ore 100
Geissler's sampler 2031, 2033
Geldenhuis Deep mine, saving by hand picking 487
mill, details of stamps 221
Gem mill 940, 941, 942
of the Milwaukee Mining Company xxvi
separator, Lockhart's automatic 430
General considerations about breakers and breaking. 47
of jigs 522
regarding costs of producing lead 1974
construction of rolls 63
expenses 1123
ideas on milling 1085
milling ideas, bibliography for 1173
practice in the Witwatersrand, South Africa .. 1643
principles 1
governing costs 1940
of ore dressing 1199
pulsion 1460
suction 1461
remarks upon jaw breakers 33
table of roll data from the mills 64
Genesee-Vanderbilt mill ..... xxv, 893
Gentle Annie mill ..... xxviii, 1035
Geometrical ratio for sieve scale 367
Georgetown, Colorado, Krom jigs at 838
George V. Cresson Company 23, 72
Georgia stamp mill, an old time. W. S. Yates 2036
gold milling in. H. V. Croll 2043
Germanium, atomic weight of 1188
German mills. C. Blömeke 2034
mills 1177
arrangement of 1107
cost of milling 1135
labor in 1102
overflow battery 229
stamps 230
sweeping table 703
tests on strength of stone 301
Gernet, A. von, definition of slimes 1398
Gersdorffite, specific gravity of 1189
Geyer, R., concentrating lead and silver at Silberau. 1177
roll 70, 111
slime settling apparatus 477, 478
settler 460
G. G. Gates' hydraulic classifier 418
Giant rock breaker 22
rolls, Edison's 105
Gibbonsville, Idaho, mill at 1028, 1181
stamps at 227
Gibbsite, specific gravity of 1189
Gibs for stamp tappets 188
Gilchrist, J., Carr disintegrator 298
Peter S., test of American Process Company's drier 1599
Gillon, A., Cyclone pulverizer 299
on breakers 61
Gilpin County bumping table 680, 682
with screens attached 342
Colorado, milling system 1030
mills in 1180, 1181
milling in 1047
mills, acid water 173
screens used in 169
mortars of wood and iron 164
Gilpin County shoes and dies 183
stamp mill 152
practice 215
stamps 226
in 229
Girard water turbine 973
Girders for Nordberg steam stamp 1247
Giroux Consolidated Mines Company 1864
mill, Ely, Nevada. W. R. Ingalls 2039
Gladolinium, atomic weight of 1188
Glasdir mine, Wales, mill at 1072, 1183
oil process at 832
Glass classifier 611, 1144, 1146
jig 623, 627
launder linings at Mill 166 1856
table for film sizing tests 707
testing 1154
Glendale, jigs at 642
Montana, mill at 1179
Glenn, Wm., sampling 884
Glidden, J. T., Woodbury jig 2022
Globe battery stem guide 2012
guides for stamps 155
iron stamp guide 229
Glucinum, atomic weight of 1188
Glycerine for respirators 1100
Gmehling, A., Lohnert's ball mill 293
Lord & Banfield, Wood machines 839
Gmelinite, specific gravity of 1189
Gneiss, weight of 1190
Goddard, S. H. 1179
Edison's concentrating plant 834
rolls 110
Golconda, Nevada, Macquisten flotation process at 1555, 1565, 1611
Gold, action of gravity stamps on 314
amalgam 730, 1512
used in preparing copper plates 752
amalgamated plates used in milling 178
and silver in amalgam, proportions of 762
proportions of, caught on plates 763
retained by amalgamated plates 759
apparatus used for amalgamation 731
assay for in Mill 55 304
Mill 68 303
atomic weight of 1188
Bluff Mining Company, plant of 1654
Coins Mines Co. 1133
combination mills 1046
concentration of fine . N. J. Fleck 2036
condition of 1013
cost of producing 1974
dredges, metal riffles used on 722
dredging 1179
in general 1009
plant 1007
tables for 703
fineness in bullion 785
hydraulicking and dredging 1006
in amalgam 767
sluices, distribution of 2044
Snake River, Idaho, recovery of fine. R. N. Bell 2046
strained mercury 781
tailings, a trap to save coarse. P J. Johnson . 2024
King amalgamator 777, 1033
mill, Gladstone, Colorado. G. P. Scholl 2042
left in retorted mercury 783
loss of 786
by use of cyanide. B. C. Wilson 2024
milling. W. R. Ingalls 2040
books on v
cost of 1131, 1132
details on modern. G. P. Scholl 2035
in Bendigo. H. C. Bogdell 2034
Mexico, cheap. H. L. Collins 2033
1908. A. James 2048
notes on modern 2045, 2047
small steam stamps used for 136
mill test 1166
mill with gravity stamp and canvas table 1038
plates and no vanners 1017
mills, design and equipment of. G. A. Denny. 1261
size of grizzly used in 340
using plates, vanners, and canvas or blanket tables 1029
with gravity stamps 1013
no amalgamated plates 1014
plates and vanners 1018
miners' pan 1152

Gold obtained on canvas tables 701
ores crushed by arrastra 238
Bryan mill 272
rolls 62
steam stamps 135
Gunnison, products of stamping 139
improvements in the mechanical treatment of. W. J. Adams 2045
mills for ..1013, 1014, 1017, 1018, 1029, 1038, 1046
process of separating by clean-up pan 250
proportion of gold and silver on successive plates 763
in daily and hard amalgam 762
screening test on, at Mammoth 284
testing 1167
percentages recovered in different parts of the mill 749
Prince mill 1768
Animas Forks, Colorado. G. P. Scholl and R. L. Herrick 2042
Silverton, Colorado. H. J. Barm 2043
mine and mill, Colorado. G. P. Scholl and R. L. Herrick 1924
quartz mills, distribution of machines in 231
ratio of, to silver in plate amalgam 764
recovered by mercury traps 771
from ashes 177
waste 482, 702, 784
on cocoa matting 702
cradle 723
plates 749
riffles in Mill 56 725
retained by copper plates 765
plates 762
saved on Wilfley tables in western Chihuahua . 1665
saving fine, on Snake River, Idaho. W. H. Washburn 2044
separation from quartz by amalgamated copper plate 4
specific gravity of native 1189
pure 1189
stamping 224
advantage of using mercury in 208
stamp mills 1101, 1103
clean-up barrel in 264
suggestions for saving flour. R. P. Hall 2024
treated on outside amalgamated plates 733
value of recovered by sweating 759
Golden concentrating plant, plain transverse troughs or riffles in 772
mill 1183
Gate table 681
Star mill, mercury trap in 772
mortar 165
order of drop 215
screens in 175
stamp clean-up 201
Goldfield Consolidated Mines Company. Combination mill of 1626
Goldrinnen 702
Goodale, C. W. ..... viii, 100
Anaconda classifier 396
Chili mill 269
cleaning base amalgam 251
concentration at Butte 1176, 2035
of Butte ores 2042
cost of concentration at Butte 2048
crushing by rolls 104
steam stamps 134
milling 1130
Huntington mill 278
versus rolls 297
jig tailings at Butte 640
ore dressing at Butte 1419
power consumed in crushing 313
rolls and Huntington mills 110
silver mill at Black Pine, Montana 1175
sizing test of Butte crushed ore 100
jig tailings 607
showing losses from hydraulic classifiers 476
steam stamps *versus* rolls 142
vanners and slime tables 728
variation of power with hardness of rock 316
water consumption at Butte 1420, 1997
Goodwin, E. G., field of electrostatic separators 1553
Goose neck discharge of jig hutches 504
spigot 433
for classifiers 388
Gordon, H. A., modern stamps 225
Goslich, Griffin roller mill 279
Göthite, specific gravity of 1189
Gottesgabe mill 1177
jigs at 597, 641
stroke of jigs in 594
Gould centrifugal pump at Mill 139 1757
Mill 175 1890
Goupillière, Haton de la, angle of friction 1244
blast machines and Krom-jig 837
Carr disintegrator 298
Cours d'exploitation des mines xix
crushing 315
gravity stamps 223
grizzlies and trommels, Briart bar screen 384
hammers and breakers 56
for breaking 11
hand picking 492
jaw breaker 56
movable and fixed sieve jigs 639
rolls 109
schemes of dressing 1173
siphon separator, Dor and Büttgenbach hydraulic classifiers 476
spalling and cobbing hammers 56
Vapart disintegrator 299
Gouverneur rotary rock breaker for talc 2009
Gouyard, G. M., magnetic concentration 834
on roasting and magnetism 815
Gover mill, amalgamated plates in 746
chuck block 178
cost for water used in 206
plates in 742
screens in 175
water trough in 746
Gowan's amalgamator 789
Grab sample 845
Grade of sluices 723
Graded crushing and separation 5
by rolls 103
sizing and jigging 1120
Grading analysis, discussion of. H. S. Denny 2048
Graeter, A. E., dredge 1013
Grain, equivalents of 1187
Grains, measurement of 1138
Gram, equivalents of 1187
Granberry, J. H., magnetite deposits at Mineville, N. Y. 1568
Granby Consolidated, cost of producing copper at . 1957
hand jig xxv
mill 893
Mining & Smelting Co., mill ..... xxv, 908
Missouri, mill at 908
Grand Victory Mining Co., mill ..... xxvii, 1022
Granite, strength of 301, 302, 303
weight of 1190
Graphical representation of free settling 475
hindered settling 623
sizing tests 1139
Graphite and molybdenite dressing by oil process. J. F. Latimer 2029
angle of nip required to crush 94
crucible for melting 784
dressing 1177, 1183, 1186
in Canada. H. P. H. Brumell 2025
effect on mercury 751
for lubricating 1097
stamp cams 194
milling 1074
at Calumet Graphite Co. 2026
paddle in melting 784
separated by oil 831
specific gravity of 1189
treated on Hooper air jig 824
used in retorts 781
washing 1176
Grapple automatic feeder. C. Blömeke 2031
Grass Valley, amalgamator at 776
California, cost of producing gold in 1977
mill at ..1018, 1019, 1020, 1021, 1175, 1176, 1180, 1182, 1184
Eureka rubber used at 777
mercury trap 774
plates at 787, 788
riffles 771
shoes and dies at 183
stamps at 224, 226, 228
Gratings for jig screens 545
Graupner centrifugal roller mill 2016
Gravel mill 1017
mining in Alaska, cost of. C. W. Purington... 2037
moved by water 878

Gravel screens 339
stamp mill for cement 2012
washing 1006
Graves, F. L., dredge 1013
Gravity muller, Stanwood 1285
-screen at Mill 138 1746
specific, effect of 3
stamps 144, 1246
adjustments of 206
advantages of for fine crushing 314
analysis of Morison's curves of the velocity of 215
area of discharge 209
belt tightener 198
bibliography 223
blankets and rubber sheets for mortar blocks 148
blow, efficiency of 219
Boss cam key for 1273
cantilever frame for 1272
head for 1271
latch finger 1273
or head 185
wedge-grip tappet for 1272
buckstaves 154
California *versus* Colorado practice 215
cam shaft 190
cams 191
for 1272
Canda cams for 1273
chuck blocks 177
clean-up 201
clearance 195, 196
clutches 198
collars and bearings 190
comparative work of stamps and Huntington mills 1262
compared with Huntington mill 278
compensating weights for 1645, 1651
cost of crushing 205
Crocker's patent 229
cross sills 153
details 223, 224, 225
of screens 169, 170
dies 179
disadvantages of 222
driving mechanism 197
economic range of 1276
effect of variation in ore 207
efficiency of, compared with steam 134
false bottoms 180
feeders 199
finger bar, cam sticks, and crab 199
Foote screen for 1270
foundation 145
frames 152
gauges for screens 172
gearing 198
gibs and keys for tappets 188
Gilpin County 152
guide blocks for 1267
timbers 155
guides 154, 155
Harvey's patent 227
heavy stamps at Mill 107 1645
height of discharge 212
drop 200
Hope's patent 227
Howland's patent 225
Huntington patent 227
in South African practice 1643
iron stamp frames 158
Krupp cam shaft for 1272
life of shoes and dies 184, 185, 1277
limits of drop 216
lip apron 178
location of main shaft 197
Luckling's mortar 227
made by the Denver Engineering Works Company 1278
maintaining height of drop in 200
materials for wearing parts of 1277
mercury required 208
method of feeding 207
setting up 200
mortar blocks 145
bolts 148, 150
covers 167
dimensions 165
feed opening 166
linings 166
mortars 160, 161, 1263
Gravity stamps, mouth or feed openings in 166
mud sills 152
Newton mortar 163
Nissen stamp 1263
North Star mill 149
mortar 161, 162
number and height of drop 215
used 231
Oldham mortar 162
old wooden type 225
order of drop for 214, 1274
overflow battery 214
Pachuca 1272
parts of 181
placing screen in 170
platforms 156
posts 153
power 204, 1274
principle and purpose of 113, 1262
principles of action 144
proportions between weights of parts 189, 1272
pulley for belt transmission 197
pulp, weight of 1191
putting on new shoes 200
ratio of power required to overcome gravity 205
right and left hand cams 195
round and slotted hole screens 169
running of 206
screen area 209
frames 176
openings 167
screens 167
designation of 172
material and cost 173
sectional guides for 1268
mortar 163, 164
setting up 200
shield and splash board 177
shoe 181
and dies, size, life, cost, etc. 182, 183, 184
fastened to head 186
single and double discharge mortars 167
size of feed 207
screen holes 210
sizing tests 210
sockets in bosses 187
South African practice 221
splash boards in 177
versus swash 218
stamp stem 187
staves for shoe shanks 186
stay battery 214
stem 187
table of weights of parts 190
tappets 188
triple discharge two-stamp mills 209
types of frames 156
used in California 231
velocity cards 216
versus rolls and grinders 222
steam stamps 134
Walker's patent 227
water pipes 198
required 221
wear of shoes and dies 182
weight and blow of 218
drop, capacity, etc. 221
power, etc 219
of mortars 164
wire screens 170
stamp mills, arrangement of 1108
Gray copper and barite separated by decrepitation 829
J. W., New Zealand gold dredges 1184
rock ore, sizing test on jig tailings 607
Grease, effect on mercury 751
Greased plate 1611
used made of, in mills 890
surface action 4
for diamonds 839
tables at Mill 188 1921
for diamonds 831
Greases 1097
Greasiness of minerals 4
Greasy flotation 1121, 1611
use made of, in mills 890
Great Boulder Perseverance mine 1635
plant. R. Allen 1925
Falls, Montana, mill at 974
Fingall mine, stamp milling at the. G. E. Brown 2040
Salt Lake water, weight of 1188

Greece, ancient milling in. L. De Launay 2033
Greene Cananea, Mexico, concentration at. R. B. Brinsmade 2042
Consolidated Copper Company, copper handbook 1925
mill, Cananea, Mexico. D. E. Woodbridge 2038
Greensburg, Pennsylvania, coal washing at 1178
Greenside mill, Potterdale. W. H. Borlase 2039
Green's movable sieve jig 639
Greenstone, weight of 1190
Greenway, T. J., May and Hancock jigs at Broken Hill 643
Greenwell's conveying grate and picking table 385
Greenwood, California 1021
Gregory Bobtail mill, acid water 173
T., Ferraris hydraulic classifier 479
Grey, jig at Karwin 642
Griffin centrifugal stamp mill 234, 268
mills 2016
at Mill 105 1636
capacity of 1636
power required for 1636
in Australia 2013
life of wearing parts in Mill 105 1636
motion of the roller. H. A. Siordet 2017
number used 231
versus buhrstone mills 297
stamps 284
pulverizer 236
bibliography for 299
roller mill 235, 282, 1032
bibliography for 297
Griffith's rock breaker 59
Grill four-compartment direct heat drier 1596
Grimsley, C. P., gold dredging 1182
Grinders, Braun sample grinder 1284
capacity of. E. Rüsager 2017
classification of 1279
comparison of stamps, tube mills, and pans as fine 2015
details of 232
in the stamp mill 2016
McKenna laboratory ore grinder 1285
Nevada sample 1284
purpose of 1279
sample 256, 1284
Sturtevant sample 1284
versus gravity stamps 222
Grinding action of centrifugal pumps 870
amalgam 780
discussion of fine. W. A. Caldecott 2014
fine. A. W. Warwick 1340
in amalgamating pans 247
at Mill 105 1638
machinery 1323, 1628
machines compared with pressure 313
pans 1279
at Mill 130 1720
Australian practice 1283
Colorado Iron Works continuous pan 1282
continuous 1282
sizing tests of pulp from 1284
wear of shoes and dies 1284
versus tube mills. R. Clark 2014
Grip for stamps 200
Grist mill 232, 252
bibliography for 291
Grizzlies 336, 384
and riddles, vibrating 1346
at Mill 170 1866
mills ..1660, 1661, 1737, 1759, 1792, 1805, 1821, 1828, 1831, 1853, 1860, 1888, 1892, 1909, 1913
Denver Engineering Works Company's revolving 1353
for dredges 1012
Karlik oscillating 385, 386
life of 340
picking on 491
purpose of 340
shaking, at Mill 124 1690
vibrating 345
Grizzly bars, forms of 337
Groke's ball mill 293
Gromier, G. 58, 492, 834, 1178
hand picking spathic iron ore at Allevard, France 492
on roasting for friability 58
roasting iron ore at Allevard, France 58
spathic iron ore at Allevard, France 1178
Gröndal ball mill for iron ores. G. Gröndal 2016
versus Heberli mill 2013
G., Gröndal magnetic separators 1537
magnetic separators at Mill 59 ..... 1828, 1829
Nos. 2, 3, 4, and 5. 1537
process for iron ore treatment 2029
in Norway. H. V. Hansell 2039
iron separation by the. P. McBennie 1568
separation of iron ores by 2026
Grooves for wire rope 1095
riffle, of Card concentrators, shape of 1483
Groppel concentrator. C. Blömeke 2023
Gross, John, cyanide practice in S. Dakota 1419
Golden concentrating plant, Colorado 1183
Grothe, A., gold dredging in the United States 1183
Grouping of machines 891
Grüson ball mill 233, 260, 1182
bibliography for 293
table of details of 261
Guanajuato Reduction and Mines Company mill. C. W. Van Law 2038
T. A. Rickard 2045
Guanaxuato, arrastra at 238, 290
Chili mill at 269, 295
Guard in concentration 1123
Guarding work of machines 1111
Guess, H. A., laboratory amalgamator, *versus* actual milling 1178
Guide blocks for gravity stamps 1267
boltless stamp 2012
rollers for belt conveyors 860
timbers for gravity stamps 155
Guides for gravity stamps 154, 155
sectional 1268
types of 155
stamp stems, iron 2012
steam stamps 128
materials of 155, 156
stamp, material, life, lubrication 156
Guiding the belt on Frue vanners 645
Gun-metal screens on batteries at Mill 185 1915
Gunnison ore crushed in Tremain stamp 139
Guston, Colorado, mill at 893
rock house 485
Gute Hoffnung mill 1102, 1136
Gutta Percha Rubber and Manufacturing Company, Spadone concentrator belt 1503
Gypsum, crushing of 2017
milling in Kansas. W. R. Crane 2027
specific gravity of 1189
treatment in Montana. J. P. Rowe 2028
Gyrating amalgamated plates 741
breakers, McCully 44
motion on mechanical batea 683
or spindle breakers 1206
screens 342
for coal 2019
vanners 657
Gyratory breakers 36
Austin 1210
C. L. Hathaway 1215
Gates' cast-iron head center for 1220
gunlock manganese steel mantles for 1220
style "K" 1207
with short-head and concaves 1208
Hadfield breakers at Mill 130 1719
Kennedy 1213
Krupp 1215
McCully 1210
at Mill 139. Life of wearing parts 1222
range of adjustment of 1218
size of crushed product 1218
mill, Hathaway 1310

H

Habermann, J., Brink and Hübner disintegrator 298
conical roll shells at Przibram 111
Dingey mill 292, 293
double rolls at Przibram 111
fine crushing at Przibram 1185
fine jigs and Salzburg tables 641
graded crushing 1177
gravity stamps 224, 225
Heberli mill 292
sieve attachment 292
iron *versus* wooden stamps 229
jig eccentrics 532
Neuerberg trommel 385

Habermann, J., ore dressing at Raibl 1177
pistons 641
power for jigs 603
proposed concentration mill at Przibram 1177
crushing plant at Przibram 1176
rolls and grinders 110
at Przibram 110
Schwarzmann's rolls, Neuerberg's rolls, for crushing coal 110
for graded crushing 110
in a lead mill 110
shells in two sections 110
versus stamps 110
Salzburg table 728, 1185
Schranz mill 296
separator at Przibram 836
stamps at Przibram 229
Stefan mill at Przibram 1177
trommels and jigs at the Anna mill, Przibram 1177
screens 385
zinc ores at Raibl 1185
Habets, A., Baum jig for coal 642
Hadfield, R. A., manganese steel for jaw and cheek plates 57
on breakers 57, 59, 60
ordinary *versus* manganese steel for jaw plates 60
Blake breaker at Mill 134 1733
breaker 2009
gyratory breakers at Mill 130 1719
rigid rolls 2010
rolls at Mill 134 1733
Haile gold mine, Chili, mill at 269, 295
North Carolina, mill at 1175
plates at 735, 787
purifying mercury at 785
Mining Company 1621
Halk breaker 2009
Hall breaker 56, 57, 58
R. G., sizing test of roll product 99
stamp mill in Dahlonega district 150
Hallett, S. I. viii
Hallett's hand jig 1180
on extent of crushing desired 304
fine crushing 1004
form of launders 873
power used for crushing 309
roll speeds 88
screens in concentrating 1114
screen *versus* hydraulic sizing 2020
testing jigs 1151
table 675, 680, 1153, 1172, 2022
three mineral separation in Mill 49 676
Hallett's hand testing jig 1180
Hallidie's corrugated stamp screens 226
Halse, E., amalgamated plates 749, 755
copper plates *versus* silver plates for amalgamation 2024
tests on loss of gold with plain copper plates 749, 750
Hamboic classifier 2020
Hammer and spring mechanism for jigs 536
drop for cleaning mass copper 12
for breaking 9
cobbing 11, 480
at Mill 186 1917
kieves 726
scaling plates 760
sledging 10
and spalling 480
spalling, and cobbing 56
spalling 11
and cobbing 55
steam for cleaning copper rock 12
used in hand picking 1435
Hammerswäsche mill 1177
jigs at 597, 641
stroke of jigs in 594
Hammond, J. H. 286
amalgamated plates 735, 757
cost of gold milling 1134
plating copper plates 755
gold stamp milling 1178
gravity stamps 225, 229
mercury used in stamping 206
milling in the Transvaal 2033
plates and traps 788
riffles 721
steam stamp 166
tables for supporting plates 735
breaker, descriptions of the new 2051
Hammond cylinder feeder for gravity stamps 199
dredge at Nome Beach 2036
Mfg. Co., two-stamp mill 209, 210
roller feeder 854
Hancock, H. R., inventor of Hancock jigs 1440
jigs 504, 643, 1440, 1459, 2021
at mills 1710, 1711, 1846, 1847, 1869, 1870, 1871
Mine La Motte 2021
for dredges 2043
punchings as bed for 1459
versus Evans jigs at Mill 162 1846
water used by compared with that used by Evans jigs 1442
Michigan, mill at 993, 998
Hanctin's mill 235
bibliography for 296
Hand breaker for testing 1137
breaking 56, 57
advantages of 12
and picking 492
electromagnet 812
feeding 223, 1115
for gravity stamps 199
jig mills 892
jigs 495, 519
cost of 1126
for testing 1150
operation of 497, 894
skimming of 497
speed, labor, and capacity 499
pan 1152
with flange 1184
picking. See also Picking.
picking 480, 492, 889, 1435, 1611, 2021
advantages of 480, 2021
after breaking by hammers 9
an equation for 2021
assisted by layers on belt conveyor at Mill 145. 1781
trommels and belt conveyor at Mill 145.. 1781
at Clausthal 965
Cripple Creek, Colo. 2021
Mill 176! 1891
belt, rope and plate conveyors for 489
bibliography for 492
breaking for 1435
combined with screening on grizzlies 340
comparison of picking tables 491
cost of 487, 1438
definition of 480
general considerations on 481
in mills 485
use made of 889
mine 481
rock house 482
South Africa 482, 2021
S. African gold mines. A. C. Key 2021
light for 481
limits of 486
mathematical discussion of 2021
of low-grade ore at Leadville, Colo. 2021
nugget copper in Mine 44 54
on steam stamps 129
picking chutes 489
revolving circular tables 490
shaking tables 489
speed of revolving table used in 491
stationary tables 488
tables for 488
tests 1163
sampler for slime table 1172
sampling 844, 1570
dipper or bucket sample 845
grab sample 845
moisture samples 846
pipe sampler 845
screens 1137
sledges 10
kinds 10
sorting tests at Mill 162 1842
washers for placer work 723
washing 319
Handles for hammers 11
Handling concentrates at Mill 173 1881
Hanna, M. & M. Company mill, Capitol City, Colorado 2043
Hansell, N. V., study of water jigs 1463
Hanson, P., on Tremain stamp 139
Hard amalgam 750
causes of 761, 767
on plates 760

Hard amalgam, proportions of gold and silver in.... 762
banks in jig beds 600
Hardinge, H. W., Hardinge conical tube mill ..1280, 1296, 2014, 2016
conical tube mill, capacity..... 1296
power required by 1296
Hardman, J. E. .....viii, 196, 1184
absorption of amalgam by copper plates 765
amalgamated plates 735, 748, 751, 752, 762, 765
amalgamation 788
blow of stamps 220
breakers 60
false bottoms in mortar 180
Forster breaker..... 60
foundation for gravity stamps 145
gravity stamps 225
keeping accounts 1178
keys for stamp cams 192
mortars 165
Oldham and Waverley mills 228
gold stamp mill 1184
plates and traps in the Oldham mill 789
stamp stems 187
Hardness of minerals..... 2
Hard rock phosphate..... 895
Hardwick, F. W., Baum jig..... 642
Harmotome, specific gravity of 1189
Harney Peak tin mines, mill..... 1180
Harrietville mill, amalgamated plates in.....745, 748
mortar and screens 226
shoes and dies at 183
Harrington and King, clear punched slotted screens 169
material for screens 355
screens, table of dimensions 168
stamp screens 168, 169
standard plate screens 369, 370
trommel at Mill 144 1771
Harris atmospheric discharge for jigs 583
Corliss engine 925
Harron, Rickard, and McCone, the new improved Huntington mill 1313
Harshaw mill 1174
amalgamating pans at 290
amalgam in 783
Boss classifier at..... 478
cone classifier at 425
fuel for retorting amalgam 782
grizzlies in 385
high stamp capacity 207
settlers in 787
stamps 224
wear of amalgamating pan..... 249
Hartman mine, power jig used at..... 506
movable sieve jig at..... 506
Hartzell Concentrating Company mill .....xxix, 1055
Harvey's stamp 227
Harz, bull jigs at Mill 162..... 1843
jigs 507
at mills..1692, 1693, 1694, 1701, 1702, 1703, 1725, 1728, 1729, 1743, 1744, 1750, 1751, 1752, 1753, 1767, 1772, 1773, 1774, 1775, 1829, 1837, 1843, 1854, 1855, 1869, 1877, 1878, 1879, 1898, 1913
construction of.....524, 525, 527
iron balls for bedding 1458
Krupp jig 1446
tailboard in 551
using one shaft and eccentric for plungers ... 530
versus Collom jigs 515
mills in the..... 1176
round rotating cement buddles at Mill 150..1800, 1801
slime tables in 697
use of Linkenbach pointed boxes in..... 441
Haskell's log washer 327
Hassell Iron Works Company, King's bucking board 1323
Stanwood gravity muller or King's bucking board 1285
Hatch & Chalmers cost of hand picking 487
hand picking on the Rand..... 492
F. H. and J. A. Chalmers, gold mines of the Rand xix
gold stamp mills in S. Africa..... 1173
Hathaway, C. L., Hathaway gyratory mill 1281, 1310, 1323
gyratory breaker 1215, 1223
Rock Crusher Company, ... 1223
Hauer, J. von, Blanton cam 229
Pape-Henneberg Machine..... 838
Hauraki Peninsula, New Zealand, cyanide mills in 1181
Haurez, P., Carr disintegrator for coal 298
Haüssner, A., curves for lifting cams 229
Haverstraw sandstone, compressive strength of 300
Hayden, Ralph, free-settling velocities 1421
Head center, Gates cast-iron, for gyratory breakers . 1220
for gravity stamps 185
spindle breakers 46, 47
turbine water wheels 1090
motion of Card concentrator 1483
New Standard concentrator 1478
Overstrom table 1485
Wilfley slimer 1504
table 1466
plunger jig..... 518
Heard, John, Jr..... 288
concentrating antimony on Paddock jig 838
Krom jig 825
and Paddock jigs 838
Paddock air jig 823
Sturtevant mill 298
Heat and quenching for breaking rock 9
effect of on amalgamation 750, 766
settling 474
slimy water..... 1414
strength of stone 302
to change porosity 4
used for settling fine slimes 1147
in straining amalgam 781
Heating for decrepitation 829
friability 56
in magnets..... 795
the mill 1098
to change magnetism..... 4
form magnetic oxides of iron 813
Heavy solutions 1174
testing by.....1156, 1993
Heberle, E., Heberli mill 292
limit of screening 369
ore dressing at Falun, Sweden 1177
discharge for jigs 581
stamps at Falun, Sweden 225
Heberle O, magnetic separation at Friedrichssegen.. 834
Heberli and Gröndal mills compared..... 2013
magnetic separator..... 799
mills 141, 232, 257
bibliography for..... 292
compared with Schranz mills..... 292
power required for 260
tests on work required by 305
versus rolls 258
system of trommels 364
wet magnetic separator 810
Heberwasche 421, 478, 520, 610
used at Mechernich 477
Hecla mill 1179, 1892
jigs in 642
Mining Company..... 1688
Heclon breaker 2009
Hector mill 1184
Mining Company mill..... xxvii, 1014
Hedburg, E., hand jigs and Cooley jigs in southwest Missouri..... 643
jig 2022
magnetic separator. R. T. Clegg 2030
Height of chuck blocks 177
discharge in stamps 212
of steam stamps 129
stamps at mills..1621, 1624, 1632, 1640, 1661, 1668, 1677
in California 1619
drop of stamps 200, 215
in mills ...1618, 1620, 1621, 1624, 1626, 1632, 1640, 1658, 1661, 1668, 1677, 1769, 1915
gate and dam in jigs 578
riffle cleats for Wilfley table..... 1468
Pinder concentrator 1481
tailboard affecting jig capacity 601
on jigs 550
Heinstein's ball mill 294
Helena & Frisco mill 1178
Gem, Idaho, tree of the. W. M. Edwards 2034
Mining Company 943
mill .....xxvi, 942
zinc concentrator, the new 2047
Helical current in classifiers 401
Helicoid conveyor 1582
Helium, atomic weight of 1188
Hell upon Earth mill .....xxv, 893
Helmhacker, R. 225
hand picking of quicksilver at Idria, Austria... 493
quicksilver concentrator at Idria, Austria 1183

Hematite, See also Iron.
concentration of ... 1054
crushed by Minnesota Iron Company ... 51
method of washing at Iron Mountain, Missouri ... 334
mill for ... 897
ores, magnetic separation of ... 809
weight of ... 1190
preparation for paint ... 839
separated by magnets ... 790
specific gravity of ... 1189
treated by jig at Iron Mountain, Missouri ... 500
Vermillion, action of Monarch breaker on ... 21
Hemp ropes ... 1095
Hendrick Manufacturing Company's screen at Mill 157 ... 1820
steel plates for tower screens at Mill 158 ... 1822, 1824
Hendrie & Bolthoff, double-cone classifier ... 427
portable stamp mill ... 226
Mfg. and Supply Company, King screen ... 1360
Hendryx cyanide method at Nelson, British Columbia ... 2035
Hendy and Meyer, rolls ... 76
Challenge feeder used in Huntington mill ... 278
feeder ... 853
concentrator ... 683
feeder ... 136
for gravity stamps ... 199
rolls ... 71
gold hand pan ... 1184
Machine Works, Blake breaker ... 22
mechanical batea ... 683
on design of cams ... 196
two-stamp mill ... 209, 229
Henninger's limonite washer ... xxv, 895
Henrich, C., blende dressing at Webb City, Missouri 1175
Henry, A., breakers ... 57
capacity of jigs ... 597
dressing lead and zinc in Belgium and the Rhenish provinces ... 1176
gravity stamps ... 224
hand breaking and jaw breakers in Belgium ... 57
Harz eccentric jigs at Przibram ... 641
jigging in Belgium ... 641
labyrinths, pointed boxes, Engis trough classifiers, Dor classifier, and siphon separator used at Mechernich ... 477
magnetic separation at Przibram ... 833
ore dressing at Przibram ... 1176
Rittinger *spitzlutte* at Przibram ... 477
table ... 728
rolls ... 110
stroke of jigs ... 594
wash trommel ... 335
Henry Faust jigs, slope of sieves in ... 548
width of sieves in ... 591
Faust mill ... xxv, 901
Nourse Gold Mining Co., sand wheel ... 865
tailings wheel at ... 884
Hensburg, great screening tower at ... 2018
Hercules mill, Burke, Idaho. S. Turner ... 2045
rock breaker of Blake type ... 22
Hering, R. and J. C. Trautwine, Jr., formula for the uniform flow of water ... xix, 877
launders ... 885
C., tables of equivalents ... xix, 1187
Herräng, Sweden, Gröndal magnetic separators at ... 1537
Herreshoff roasters at Mill 168 ... 1862
Hersam, E. A., power required for crushing ... 1334
power in crushing ... 1340
size of opening in screens ... 2019
sources of lost power in crushing ... 1325
theory of crushing ... 2018
Hessite, specific gravity of ... 1189
Heusschen furnace for decrepitation ... 829, 839
Hewitt's amalgamator ... 788
Hexagonal trommels ... 362
at Mill 183 ... 1913
Hibernia magnetic concentrating plant ... 835
mill ... 1135, 1183
magnetic separation at ... 803
New Jersey, mill at ... 1058
Hick revolving grizzly bars ... 385
Hicks, J., slimes in dressing tin ... 1183
tin ores in Cornwall ... 1180
Hidden Treasure mill ... xxviii, 1035
acid water ... 173
mortar ... 165
plates in ... 788
High-power magnetic separators ... 805
speed machines ... 1097
High-speed rolls, advantage of ... 88
Humboldt ... 1241
Krupp ... 1238
versus Bryan mills ... 1309
Hill, R. T., Mexican placers ... 2036
Hille, F., Bilharz *spitzlutte* ... 477
concentrating galena and zinc blende ... 1178, 1181
gravity stamps ... 225
Krupp amalgamating table and Laszlo amalgamator ... 788
losses in gold stamp mills ... 1178
material for jigs ... 643
Himmelfahrt-Fund mine, classifier at ... 413
mill ..936, 958, 1087, 1099, 1102, 1116, 1127, 1135, 1177, 1182
sieve scale in ... 367
Himmelfürst-Fund mill ... 1177
mine, air concentrator at ... 818
dry concentrator at ... 837
Hindered settling ... 1460
and suction, final conclusions on ... 631
classifiers, deep-pocket ... 1387
shallow-pocket ... 1384
defined ... 464, 1421
full-tube velocities of quartz and galena ... 1430
general principles ... 610
in kieves ... 727
pan concentrator ... 683
on jigs ... 494
ratio, theoretical value of ... 1427
free to hindered settling ... 1430
ratios ... 617, 625
results of tubular classifier tests on ... 613
tests ... 610, 1428
in pulsion jig ... 623
use made of, in mills ... 889
versus free settling ... 1431
washer ... 520
Hinged hammer pulverizer, Jeffrey ... 1321
Williams ... 1322
stone breaker ... 2014
History of hydraulic classifiers ... 1337
Hoagland, M., Sons Co., rolls ... 77
breaker ... 57
rolls at Mill 157 ... 1820
Hobson, J. B., and E. A. Wiltsee, arrastra at Smartsville and Mooney Flat ... 290
gravity stamps ... 225
Hochstedt air blast apparatus ... 816, 839
Hochstrate air blast apparatus ... 838
dust apparatus ... 837
Hochstrate apparatus at Rheinpreussen colliery. 839
tubular classifier for coal ... 479
Hodge, C. J., Collom jig ... 510
disc motion for jigs ... 536
jigs ... 517, 522
and Cleaves sand pumps at Mill 182 ... 1910, 1911
classifier ... 476
jigs ... 1440, 1446
at mills ..1896, 1898, 1902, 1903, 1904, 1905, 1909, 1910, 1911
differential motion for ... 1457
Hodges, A. D., amalgamating pans ... 291
Comstock lode ... 291
hand sampling ... 884
Jr., impurities in amalgam ... 251
silver milling on Comstock lode ... 1175
Hoe conveyors ... 1582
at Mill 141 ... 1762
for skimming jigs ... 576
Hoffman ... 288
magnetic separator ... 832, 835
mill ... 1706
O. ... 291
cone mill ... 292
W. H., concentration at the Croton mines ... 1175
cost of milling ... 1135
magnetic concentration at the Croton iron mines ... 1180
Sturtevant mill ... 288
at Croton iron mines ... 298
Hofman, H. O. ... 1175
Anaconda Copper Company ... 1922
Blake and Gates breakers in the Black Hills 57
gravity stamps in the Black Hills ... 224
grizzlies in the Black Hills ... 385
hand sampling and various samplers ... 884
Homestake and Caledonia mortars ... 228
Lewis and Bartlett bag process ... 885
metallurgy of lead ... xix

Hofman, H. O., mortars 164, 165
mortar linings 166
plates and traps in the Black Hills 787
roasting a blende-marcasite concentrate for magnetism 2025
Hog trough classifier 390, 476, 1367
Hoists 1608
for gravity stamps 200
Pilling's pneumatic 1608, 1610
Holes, arrangements of in screens 168
in screens relation of thickness of plates and wires to diameters of, as found in the mills ... 372
size of, in sieves 546
Holibaugh, J. R., hand jigs in Missouri 643
zinc ore in Missouri 1181
Holloway, G. T., disadvantage of the mesh designation 2019
Holman Brothers' Ltd. Acme table 1506
Holmes & Blanchard, buhrstone mill 252
Holtoff, H. C. viii
Homberg, Hochstedt apparatus at 816
Home Run mill, Prescott, Arizona, Nissen stamps at 1264
Homestake mill, cam shafts 190
cyaniding at. F. L. Bosqui 1925
dies used in 163
dimensions of tappets in 189
fineness of amalgam 764
guides in 155
history of the. C. H. Fulton 2041
life of cam shafts in 190
shoes and dies 184
mortar mouth 166
mortars 164, 165
plates in 789
rate of crushing in 165
screen frame 177
screens used in 175
shoes in 181
stamps 224
tappets 188
treatment at the. C. W. Merrill 2044
Mining Company 1133
mill ..... xxviii, 1025, 1181, 1639
mortar 160, 228
at Mill 106 1640
modern 1267
ore, metallurgy of. C. W. Merrill 1419
slime plant. M. Ehle, Jr. 1925
stamp compared with steam stamp 136
Hood, O. P., test of Nordberg stamp at Mill 181 ... 1250
Hoop tighteners for trommels 355
Hooper, E. H., suspension of solids in a horizontal current of water 477
air jig 820
Hooper's vanning jig 505
Hoover, C. H., economy and speed of operating mine 1948
Hope breaker 61
Hope's stamp 227
Hopkins, T. C., washing kaolin 1183
Hoppe, O., action of jigs 499
jig bed 641
settling in water 1186
suction in a jig bed 643
tests on jigging 630
water separation 1186
Hopper bottomed classifiers 412, 413, 414, 415, 416
shaped shallow-pocket classifiers 400
unwaterer 476
Hoppers for rolls 83
Horel, V., progress in concentration 2049
Horizontal log washer 328
mills 255
plunger for jigs 517
shafts of amalgamating pans 248
washers for clay 1076
Horn amalgamating pan 291
Horn rotary slime concentrator, the 1499
Hornsilver Mining Co. 1181
mill ..... xxvii, 1015
Horn spoon 1153
Horse-power. See Power also under each machine.
equivalents of 1188
of Blake breakers 17, 21, 24
Comet breaker 41, 46
Dodge breaker 30
Forster breaker 28
Gates and McCully breakers 45
breaker 38, 46
McCully breaker 44
rolls 64
Horse-power, rule for breakers 53
steam stamps 131
Sturtevant roll jaw breaker 33
Hoscur ore feeder 2032
Hot air heating 1099
sand for sweating plates 759
water for sweating plates 759
Hotop, oscillating ram for rolls 112
washing of clays 1185
Houghton County, Michigan, mill in 994, 1000
Housing for elevators, etc. 862, 1099
rolls 83
trommels 358
Howe, H. M. 188
and W. E. C. Eustis, magnetic process for nickel 833
Howell J. and M. B. Jamieson, Collom jigs at Broken Hill 643
concentrating silver ores at Broken Hill, New South Wales 1182
stamps at Broken Hill, New South Wales 227
steam stamps at Broken Hill, New South Wales 142
Howell-White roasting furnace 1545
furnaces at Mill 148 ..... 1792, 1793
Howland mill No. 1. 235
No. 2 232
bibliography for 290
patent stamp battery 229
pulverizer No. 1, bibliography for 297
riffles 722
rotary stamp mill 225
Huanchaca Mining Co., size of stamp feed 207
Hubbard, Prevost, decomposition of the feldspars ... 1400
and Cushman, A. S., decomposition of feldspars 1418
Hübner, Bartsch and Linkenbach tables 729
testing slimes at Tarnowitz 1186
Huet & Geyler's jig 641, 643
settling cylinder 478
Huff, Charles H., electrostatic separation 1551
electrostatic separator 1551, 1611
principle of action of 1552
sizes treated by 1552, 1553
Hughes Daviot, electromagnet 812
penumatic stamp 143
Huile gold mill. A. Lakes 2041
Hull, Florida, mill at 897
Humboldt coal breaking machine. M. J. Julin ... 2050
crushing rolls 1244
Engineering Works Company 1493
ball mill 1301
Bartsch rotary percussion table 1497
belt percussion table 1496
Blake breakers 1205
Dodge-type breakers 1206
high-speed rolls 1241
Humboldt crushing rolls 1244
magnetic separators 1530
picking table 1437
sand wheels 1586
tables at Mill 150 ..... 1800, 1801
high-speed rolls. C. Blömeke 2016
"Perfect Table" 2023
riffle concentrator. C. Blömeke 2023
Humphrey, R. K., roll crushing 2010
mill 1766
Creede, Colorado 2044
new rolls 2010
quartz mill 2015
rolls 1234, 1244
table of sizes, power, speeds, weights, etc. ... 1235
Hundt's settling tub 478
Hungarian mercury wells 770
mill 787
riffles 725, 770
Hungary, stamp mills in. J. Bauer 2034
U-shaped classifier 424
Hunt, R., arrastra 290
Ball's revolving knife buddle 334
breakers 56
British mining xix
buddle jig 518
buhrstone mill 253
Carr disintegrator 298
cost of crushing by rolls 104
Cunnack's pulverizer 293
edge runners 295
English, German, and French types of rolls .. 109

Hunt, R., general milling ideas 1173
gravity stamps 223
grist mill or buhrstone mill 291
Harz, Argalls, Collom, circular slime jigs ... 639
Husband and Sholl pneumatic stamps, Patterson spring stamp 143
Jordan's pulverizer 299
Marsden breakers 56
Michell and Tregoning pulverizer 294
Nicholas pulverizer 292
pointed boxes, cone classifier, Hodge's classifier 476
Wilson's small stamp 142
Huntington amalgamating pan 291
centrifugal roller mill 235
mills 110, 228, 276, 1182, 1311
as regrinding machines 1332–1333
at Butte, Montana 2014
mills..1625, 1668, 1684, 1686, 1687, 1689, 1694, 1701, 1711, 1738, 1753, 1839, 1845, 1867, 1869, 1870, 1871, 1897
bibliography for 296
Boss, M. P. 1281
roller mill 1313
capacities of 281
with various screens 1314
centrifugal force in 278
comparative work of stamps and Huntington mills 1262
cost of crushing by 281, 1318
costs, life of, wearing parts in the. C. E. Parsons 2014
die rings and roller shells 280
dimensions and weights 280
feeding 1314
foundations for 1313
Fraser and Chalmers figures on 280
Harron, Rickard & McCone 1281
improved 1311
in Australia. A. G. Charleton 2014
El Oro, cost of running 2014
general 1313
southern Rhodesia. C. Parsons 1323
life of screens 1317
wearing parts 1317
new improved 1313
number used 231
Power & Mining Machine Co. 1281
purpose, power and capacity 280
quality of work done by 1317
screens for 281, 1314
screen sizing test of feed and product of Huntington mill 1316
Sherman 1281, 1313
sizing test of pulp from 1317
table of sizes, power, speeds, and weights of improved 1312
used in California 231
Mill 21 413
near Tremnitz, Hungary 282
valuable paper on. C. E. Parsons 2016
versus Bryan mills 273
stamps 228
oscillating stamp 227
patent stamp mill 229
theory of flotation processes 1556
Huntoon, L. D., separation by crushing and screening 1566
Hurdy Gurdy water wheels 1023, 1089
Hurst, George H., methods of washing 1173
painters' colors, oils, and varnishes xx
Hürter, C. S, wave action on amalgamating plates.. 1619
Husband and Sholl penumatic stamp 143
pneumatic stamps 141, 1082
Hutch, discharges into the 586
for jigs, slope of 523
product, definition of 495
on jigs, defined 495
Hutches for jigs 523
Hutchins, J. P., dredging in Montana 2039
the Klondike 2038
gold dredging in 1906 2038
history of dredging 2037
Hutchinson, W. S. viii
Gates canvas plant 729
plant at Grass Valley 1184
milling in Chihuahua, Mexico 2038
mining in western Chihuahua 1923
sieve scales 1361
standardization of laboratory screens 1366
Hutchinson, W. S., standardization of screens 2019
Huxley, E. C., breakers 57
Hoagland breaker 57
Hyams, G. M. viii
Hydraulic classifier. See Classifiers.
classifier 387
Bilharz 475
Dalton 398
deep double trough 416
pocket 409
double cone 426
extent of classification 1433
Ferraris 400
Fraser and Chalmers 416
G. G. Gates' 418
hopper-shaped shallow-pocket 400
measures of a four-spigot, with sorting columns of a 3-inch pipe 403
purpose and essential qualities of 389
Richards' shallow-pocket 401
sizes of feed to 389
trough or shallow-pocket 389
Yeatman 399
discharge for steam stamp at Mill 179 1897
giants 55, 333
for phosphate 898
Monitor 333
gold mining. G. H. Evans 2041
jigs, compared with air jigs 825
mean depth in launders 876
methods, discussion of. R. H. Grider 2026
mining. See under Placer.
at British Guiana. F. W. Luick 2033
by elevator. C. W. Wright 2044
cost of. W. H. Radford 2033
in British Columbia 2033
California 2037
W. H. Radford 2033
Colorado. W. E. Thorne 2033
K. Thomas 2046
riffles for 721, 770
mortar discharge at Mill 182 ..... 1909, 1912
pneumatic, and spring stamps 1246
separators at Kalgoorlie mill 2034
stamps 1257
the Denny 1257
tables 1187
water for jigs 537
quantity 598
table of 596, 597
in classifiers 387
Hydraulicking 897, 1006
bibliography for 1173
in Oregon. A. P. Dittmar 2045
of low-grade gravels. P. Bouery 2044
plants 1006
under artificial pressure. J. A. Yeatman 2044
See also Placer.
Hydrochloric acid in settling tests 1147
used on plates 752
Hydrogen, atomic weight of 1188
amalgamator 787
Hyposulphite leaching 1167

I

Ice, specific gravity of 1189
Ichon, separation process 839
Idaho, cost of mining and milling in 1130
milling in 1134
dredging in 1009
mill in 1178
mine, Alabama, mill at 1174
amalgamation at 787
Springs, Colorado, Cammett table at 677
mills at 915, 1029, 1047
pan concentrator 683
shaking screens at 342
Idlers for belts 1094
Idlewild Gold Mining Co., mill 1021
Idria, Austria, hand picking at 493
mill for quicksilver ore 1074
picking of waste at 481
quicksilver dressing at 1183
I Know mill ..... xxv, 901
Ilmenite, specific gravity of 1189
Imlay table 681
I. M. M. standard laboratory sieve scale 1362
Impact screen 1348, 1351
at Mill 151 1803

Imperfections of deep-pocket classifiers 409
Imperial magnetic separator 2209
ore screen 2019
table of sizes and capacities of the 1350
Improved Huntington mill 1311
table of sizes, power, speeds, and weights .. 1312
Impulse water wheels 1089
Impurities in amalgam, removal 251
Inch, equivalents of 1187
Included grains 318, 1121
action of 892
Indian metallic red paint mine 839
Indicator bell on steam stamps 129
cards of steam stamps 130, 131, 132, 133
vanners 657
diagrams of Nordberg single-cyclinder steam stamp 1250, 1251
steeple-compound stamp 1254
for jig 632
Individual mortar 2012
mortars at Mill 165 1852
Merrill's mortar 1264
M. P. Boss mortar 1265
Nissen mortar 1263
Rapid Economy 1266
Induction motor, increased use of in milling 1927
Ingalls, W. R., conveyors 1609
Ferraris ball mill 1323, 2014
Giroux mill, Ely, Nevada 2039
gold dredging in the United States 1183
milling 2040
Macquisten process 1569
mill of the Steptoe Valley S. & M. Co., Ely, Nevada 2039
milling the ore of Bingham, Utah 2039
ore drying 1610
power required for screw conveyors 1583
Inman, A. L., multiple jaw breaker plant 57
on breakers 57
Inscribing circles for cams 196
gravity stamps 216
Inside amalgamated plates 178
amalgamation 223
Inspection of jig bed 1171
Instalment plan of mills 1118
Institution of mining and metallurgy on sieve scales 1362
Instructions for mounting Blake breaker 18
Interest and depreciation on breakers 49
Intermediary jig 571
Intermediate bins 843
Intermittent automatic discharge for jigs 584
bumping tables 682
movable sieve power jigs 506
or tank system of working amalgamating pan . 248
surface tables 700
blanket tables 703
carpet tables 703
cocoa matting 702
Cornish "frames" 704
German sweeping tables 703
International committee of atomic weights 1188
Emery & Corundum Co., mill 1078, 1079
magnetic separator 1533
separators at mills 1535, 1746, 1747, 1748
Phosphate Company, McLanahan and Stone single-roll crusher at 1241
Interstitial currents, tests on 626
factor on jigs 575
ratios on jigs 627, 630, 631
Investigation of box classifiers 434
feed, slope, and water for film sizing tables .. 707
pulsion and suction in mill jigs 632
settling of fine grains 473
Wilfley table work 1469
classified feed 1473
conclusions 1477
discussion of results 1474
natural feed 1471
practical applications of results 1477
sized feed 1473
Iodide of methyl 1156
potassium and mercury 1156
Iodine, atomic weight of 1188
Iodyrite, specific gravity of 1189
Iridium, atomic weight of 1188
specific gravity of 1189
Iridosmine, specific gravity of 1189
Irish Creek, tin ore at 288
Iron-aluminum, alloy for jig beds 575
Iron amalgam 730, 751
Iron, atomic weight of 1188
balls for jig beds at Mill 183 1458
City mill, effect of slow drop stamps 220
cloth screens 173
concentrates, disadvantage of 1053
crushing 60
for jig screens 545
mill buildings 1088
surface of Gilpin County table 681
frames for jigs 522
vanners 651
Gate, Virginia, iron ore from 809
guides for stamps 155
jig 510
life of 604
tanks 522
lining for ore bins 842
lost in pan amalgamation 249
magnetic oxides of 813
manufacture in Alaska. W. B. Phillips 2025
Mountain, Bradford jig at 500
hydraulic nozzle at 334
mill at 895, 897, 1185
plate screens in 173
sampling at 845
sizing tests of trommel products at 383
ore by Edison process, preparation of 2010
concentrated by magnets 798
concentration of 2018
bibliography for 1173
Lake Superior. L. H. Hardenburgh 2036
R. Nordensten 2040
cost of milling 1135
producing concentrates in eastern United States 1986, 1987
in Quebec, milling of chrome. W. H. Edwards 2043
jig for 518
magnetized by heat 799, 800
mills for 895, 1053, 1065, 1066
of Coleraine, Minn. 1924
separated by magnets 790
treated by hydraulic nozzle 334
in log washer 324
by wash trommel 330
washing. W. Kellett 2018
ores in Birmingham, Alabama, washing soft. W. R. Crane 2041
magnetic separation of. H. Wedding 2030
roasted for magnetism 814
to magnetic oxides 813
washing of Mesabi 2040
permeability of 792
pipe 1106
sizes 405
punchings for jig bed 574
riffles 722
riffle tables on dredges 1008
sieve frames for jigs 539
specific gravity of 1189
cast 1189
wrought 1189
stamp frames 158
strip for fastening amalgamated plates 735
table for amalgamated plates 735
wear and loss of, in amalgamating pans 249
Irons on launders 872
Irregularity of feeding 1115
Isbells improved hydraulic sizer 2020
Isel Corundum Co., mill 1183
Ivanhoe mill 1731

J

Jack 900
Jacket shaft for gravity stamps 199
steam for amalgamating pan 243
Jackling conveyor belts at Mill 167 1859
Jackson, California, mill at 1031, 1034, 1037
vanner at 653
concentrator, Idaho Springs, Colorado. C. M. Rath and R. L. Grider 2042
J. W., rolls 111
rolls 72, 76
roll speeds 87
James, Alfred, definition of slimes 1398
discussions of the tube mill 2015
milling practice on the Rand 2014
tube mill installation 2014
automatic ore feeder 2032

James Bogardus eccentric mill 259
Carkeek classifier 416
concentrator 1490
slimer 1491
Jamieson, M. B. and J. Howell, Collom jigs at Broken Hill 643
concentrating silver ores at Broken Hill, New South Wales 1182
stamps at Broken Hill, New South Wales . 227
steam stamps at Broken Hill, New South Wales 142
Janin, L. Jr. viii
adjustments of a stamp battery 227
amalgamated plates 743, 748, 750
amalgamating pans 291
arrastra 290
impurities in amalgam 251
plates and traps 789
purifying mercury 785
rolls for cyanide process 111
straining amalgam 781
Jaquet, J. B., hydraulicking in New South Wales .. 1178
Jar, affecting settling of slimes 1149
effect of, on plates 735, 761
Jars for settling tests 1146
Jarvis, R. P., determination of the hindered-settling ratio between quartz and galena 1460
investigation on jigging 1463
suction in jigging 1462
Jaw breakers 55–57
action of 36
capacity of 52
classified 13
compared with spindle breakers 51, 53
cost of 52
distribution of crushing in mill 54
fine crushing in 54
friction 54
general remarks 33
having equal motion on coarse and fine lumps 25
greatest movement on largest lump 28, 1205
smallest lump 13, 1200
intermittent action of 55
Krupp's wearing parts for 1221
necessity for simplicity of action in 36
number used 51
of Dodge type 28
Western Wheeled Scraper Co. 25
power of 52
principle of action 52
running cost 54
size and shape of mouth 54
sizing tests of product 53
table of cost of crushing of 50
taper 52
tests on work required for 307
weight of 52
breaker plates, comparative wear of metals for, in Blake breakers 48
movements on breakers 34
Jeffrey belt conveyor 859
conveyors at Mill 183 1913
Century conveyor belt 2032
coke crusher 2013
Columbian separator 2019
double beaded flight conveyor at Mill 126 1706
Manufacturing Co., bucket elevators 864
Columbian pulsating screen 343
drag or disc conveyors 1583
friction clutches 1607
pulverizer and shredder 1321, 1323
table of sizes, capacities, power, etc. 1322
steel link-chain scraper-conveyor at Mill 126 ... 1709
swing hammer crusher 1281
capacity of 2015
trippers at Mill 183 1913
Jenisch ball mill 233, 261
Jenkins, C. V., keeping accounts 1184
Jenks, C. N., dressing corundum 1183
washing pan for corundum 335
Jerking tables 667
Bartlett 492
for testing 1153, 1171
principle of 644
trough conveyors 861
Jets on slime tables 688, 689
Jet washer 334
J. H. Frenier and Son, spiral sand pump made by . 870
Jig and table departments at mills 1691, 1811
bedding 1458
Jig bed inspection 1171
beds, boils, and hard banks 600
box 495
concentrates, removal of 586
department at Mill 161 1841
discharges 510
at Mill 137 1458
Krupp Harz 1446
New Century jig 1445
Woodbury 1447
frames 507, 522
Hancock 1459
hutches 523
indicator 632
linings 527
mechanism 519
mechanisms. See the Individual Jigs.
New Century 1459
Richards' pulsating 1459
screens and screen frames 510, 538
cost of 547
cross bars on 504, 574
details of 540
length of 592
materials for 545
percentage of opening 546
slope of 548
supports for 539
spigots 527
tailings, definition of 494
removal of 587
tanks, materials for 522
testing 1161
Jigging, an investigation on. R. P. Jarvis 1463
comparison of English and continental system of. H. S. Munroe 1463
effect of suction 628
English system of 1463
general principles of pulsion in 1460
suction in 1461
laws of 610
lever on hand jigs 496
mills 1101, 1103
power used in 602
using hand jigs 802
new developments in 2022
pulsion velocity in 1460
sizing before 1463
suction and pulsion in 1460
tank 495
tests 1165
on mixed sizes 630
theory of 631
suction in jigging 1462
without sizing 609
Jigs 494, 1150
See also Air Jigs, Hand Jigs, Harz Jigs.
accelerated 507, 510, 515, 519
mechanisms for 533
action of 494
adjustments of 595
pulsion and suction 598
throw 531
air 640, 820
bibliography for 837
versus water 826
and vanners *versus* oil concentration 832
results compared with Elmore process 832
Argall's 639
at mills .. 1448, 1449, 1685, 1686, 1692, 1693, 1694, 1701, 1702, 1703, 1707, 1708, 1714, 1720, 1725, 1728, 1729, 1737, 1738, 1743, 1744, 1750, 1751, 1752, 1753, 1767, 1772, 1773, 1774, 1775, 1788, 1789, 1792, 1793, 1796, 1797, 1798, 1799, 1800, 1801, 1812, 1829, 1832, 1833, 1837, 1843, 1844, 1845, 1849, 1854, 1855, 1858, 1864, 1867, 1869, 1877, 1878, 1879, 1885, 1892, 1893, 1902, 1903, 1904, 1905, 1913, 1928, 1929, 1930
automatic discharges for 576, 577
Baum 519
bibliography of 639
Bilharz circular 504, 518
oblong movable sieve 503
bottom bed of, products of 495
Bradford 500
Braun 641
buddle 518
cam and gravity in Stutz coal jigs 537
spring mechanism for 507
capacity of 599
power and water 596, 597

Jigs, Cazin's 640, 641, 642, 643
center discharge in 582
changes in the Harz 2022
circular 518
classes of 551
classification of 551
classifier 1447
at Mill 120 1452
cleaning sieves of 576
clearance of plunger 529, 530
coarse concentrates of 494
Collom 510, 1440, 1446
compartments in 507
compressed air 519
Conkling 503
connecting rods for 530
construction of 524, 527
continuous movable sieve power 499
Cooley 522, 643
cost of 604, 1126
cover 537
dead box on 510
depth of longitudinal partition 524
details of 552
Diescher coal 520
difference in specific gravity of minerals for ... 609
different types of 2021
differential-motion, variable-crank mechanism of 1457
disc motion in 536
discharges into the hutch 586
with unwatering sieves 586
disposal of concentrates in 585
double discharge in 583
with one shaft 530
drop between sieves 549
eccentric for 510, 531
effect of bedding 1463
slimy water 599
elliptical gear in 536
Evans 517
Evrard's 642, 643
experimental data on. G. C. Bring 2022
feed aprons for 549
box for 549
Ferraris intermediate 539, 540, 584
fine concentrates of 495
fixed sieve 507, 1444
for testing 1150, 1174, 1989
three mineral separation 590
two mineral separation 589
four mineral separation on 590
Francou 519, 643
gate and dam discharges 577
general considerations 522
Green's movable sieve 639
Hancock 504, 643, 1440
hand 495, 519
practice in the mills 498
Harz compared with Collom 515
-eccentric bedded sand-jig at Mill 125 1703
type 507
head plunger form 518
Heberwasche 520
height of gate and dam 578
tailboard 550
hinged connecting rod for 530
Hodge 1440, 1446
Hooper's vanning 505
Huet & Geyler's 641, 643
hutch spigot 507
hydraulic water quantity in 537, 598
indicator cards of 632
intermittent automatic discharge 584
movable sieve 506
interstitial factor 575
iron 510
balls for bedding 1458
sieve frames 539
kinds of 525
Krom's penumatic 824
Krupp Harz 1446
labor for 604
Lamarche and Schwarz 641
Lemière's 643
length of stroke 594
life of 604
limits of sizes treated by 604
longitudinal partition 524
Luhrig 538

Jigs, McLanahan's 518, 538
making coarse concentrates and tailings 570
hutch and tailings 571
hutch and tailings 572
material of bottom bed 573
materials for tanks 522
May's 643
mechanism for 517
method of running 551
methods of feeding 548
movable sieve hand 495
testing 627
New Century 1444
drop motion 537
number of compartments 588
strokes 592
operation of 506
Osterspey 538, 642
Parsons & Fisher 517
pipe discharge in 583
Plumb circular 641
plunger 528
attachment to connecting rods 529
plungers for 510, 517
on 510
position of 1108
power used by 602
principle and advantages of 2022
purpose, and definitions 494
products of 494
pulsion 518, 538
and suction investigated 632
type 520
purpose and adjustments 552
range of sizes fed to 606
relation of sieve to plunger 528
removal of coarse concentrates 576
tailings in 587
repairs on 604
Rexroth 641
Richards' pulsator jig 1453
table of sizes, capacities, and dimensions . 1455
Rittinger's 643
Robinson 504
Rogers 642
Schranz 503, 641
screen saving device for 2022
shaft and pulleys for 532
Sheppard 538, 642
side discharge in 580
plunger 529
sieve wires and prices 547
sieves 641
size of grains of bottom bed 575
sieve hole 573
sizing before jigging 1463
skimming of 576
slime 518
slope of hutches in 523
sieves 548
slow return 533
speed of 592
Spilsbury 527
spring and bell crank mechanism for 511
Stapff 642, 643
stay box for 551
boxes for discharges 584
steam driven 519
Stroh's 642
study of water. N. V. Hansell 1463
G. G. Bring 1463
Stutz 538
coal 523
tailboards for 510
testing of 1170
tests on suction in 627
thickness of bottom bed 575
top layer of, products of 495
under-piston type 520
unwatering boxes 588
Utsch 519, 640, 641
versus Ferraris tables. M. Lenicque 2021
magnets 836
tables 606, 641
Vezin 1150
water for 537, 598
Wendt 530, 640
whole bed of, products of 495
width of sieves 591
Wimmers 643

Jigs with movable sieves 1440
Woodbury 1440, 1447
working of 506
Johannesborg, Sweden, mill at 911
mill 913
South Africa, mill at 1184
Johnson 324
figures on sampling 852
filter press at Mill 117 1674
F. M., on Griffin mill 284
G. and A. Treloar, magnetic separation of tin and wolfram 2029
G. R., log washer at Longdale, Virginia 1175
log washing plant at Longdale, Va. 335
J. E., Jr., automatic shoveler 885
reservoirs for tailings of the Longdale Iron Co. 477
mechanical sand shoveler 461, 899
at Mill 155 1817
ore mill. J. Johnson 2015
Paul, Cornish sampling at El Paso smelter 884
rules for sampling 849
steel for wearing parts of breakers 48
Johnston vanner 652, 1499, 1501
vanners at mills ..1502, 1669, 1834, 1850, 1851, 1852, 1858
in California practice 1620
John Taylor and Company 1137
Joints for belts 1093
Jones, Clemens, costs of concentrating iron ore 1135
magnetic separation of iron 1175
magnetizing hematite 833
sampler 844, 1570
Joplin district, cost of milling 1129
producing zinc in 1971, 1972, 1973
hand jigging practice 894
mill in the 1183
milling in the. E. Hedburg 2041
milling the sheet ore of. D. Brittain 2039
reverberatory furnace for magnetic separation 1545
Foundry Company, roll shells at Mill 148 1792
Jack table, a magnetic separator 2025
Missouri, mill at 901, 907
practice at Mill 148 1792
Separating Company, Cleveland-Knowles separator at 1542
Jordan's centrifugal grinder and amalgamator 234
bibliography for 295
pulverizer 236
bibliography for 299
Joseph Wharton mill 1053, 1054, 1117
Mining Co., mill 1058
Joshua Hendy Iron Works Company, Pinder Concentrator 1481
Machine Works. See Hendy, J.
Machine Works 196, 209, 229
breaker used 22
vanner 652
Journal lubrication 1930
Journals, care of 1097
for rolls 72
friction in 95
Jubilee & Salisbury mill, details of stamps 221
Judd, E. K., concentration at Virgilina 2038
ultra-violet rays for detection of willemite 2048
Julian and Smart, cyanidings of gold and silver ores 1323
Jumpers Deep mill 1185
mine, weight of ore at 1191

K

Kalb, Courtenay de 257
Kalgoorlie, ball mill practice in 1302
dry crushing at 2035
Kamfersdam mill 1080
Kanawha freestone, strength of 301
Kansas, hand jigging in 893
mill 1133
Kaolin Mfg. Co., settling apparatus 1149
settling of 1149
rate of 474
use of alum for settling 459
washing 1075, 1183
T. C. Hopkins 2026, 2028
Kaolinite, specific gravity of 1189
Karlik oscillating grizzly 385, 386
screen 386, 1185
Karwin, jigs at 642
Kás, A., Distl-Susky screw grate 386
Karlik and Klein moving grizzlies 386
Káván, Rittinger table 668
Kavicic, J., Rittinger table 728
Kayser, H. W. F. and Richard Provis, tin dressing at Bischoff, Tasmania 1182
Kearsarge mine 997
Keedy dry-ore sizer 1555
Keewatin, Ontario, mill at 1157
vanners at 657
Kegelmühle 232, 255
Keith, N. S., amalgamating plates 747, 765, 789
Kellogg, Idaho, mill at 937, 951
Kelly mill, Socorro, New Mexico. W. M. Johnson 2046
Kemp, J. F., Desloge mill for galena in Missouri ... 1185
ore deposits of U. S. and Canada 1924
Kennedy gyratory breakers 1213
Mining and Milling Company mill ..xxviii, 1031, 1037
spindle breaker 1223
Kennicutt system of softening water 1416, 1419
Kensington, F. R., washing iron ore at Cabarceno, Spain 1182
Frederick, wash trommel 335
Kent, centrifugal force 278, 827
cost of power 135, 206, 250
gauges 1194
journal pressure in rolls 96
lubricants 1097
mill 1280, 1303
mill similar to the 2017
pulverizing mill 2014
roller mill, table of details of the 1304
screen gauge 173
water pipes 858
William 50, 93, 104, 1097, 1173
engineers' pocket book xx
strength of stone 315
Kessler magnetic separator 811
Kettle for amalgam 758
Key, A. Cooper, hand picking on the Rand 492
to mill numbers xxv
the outline of mills 1614, 1615
Keys for stamp cams 191, 192
stamp tappets 188
Keystone Consolidated Mining Company mill .... xxviii, 1032, 1037
mill, mortars 164
Kia Ora dredge 1184
Gold Dredging Company mill xxvii
plant 1008
Kieves 726, 1464, 1510
at Mill 185 1916
bibliography for 727
continuous 727
coupled with slime tables 1110
depth of bed 1511
details of in mills 726
for cleaning jig concentrates 587
principles of 644
used in gold dredging 1013
Kiln for drying 881
Kilo of water 1187
or kilogram, equivalents of 1187
per square centimeter 1188
Kilogram-meters, equivalents of 1188
Kilometer, equivalents of 1187
Kilowatts, equivalents of 1188
Kimberley, diamond washing at 839, 1080
mines, weight of ore 1191
weathering blue ground at 830
Kimberlite 1081
Kimberly Wilfley mill, Kokomo, Colorado 2046
Kinds of crushing actions 8
ore for gravity stamps 207
surface on slime tables 695
King Brothers mines, mill 1079, 1117
bucking board 1279, 1285
Clarence, amalgamating pans 290
gravity stamps 223
settlers and agitators 787
silver amalgamation 1039
United States Geological explorations of 40th parallel xx
Washoe and Reese River processes 1173
magnetic separator 832
revolving screen 2018
advantages of the 2019
screen, the 1356, 1360
Kingsford Foundry and Machine Company centrifugal pump at Mill 127 1712
Kingston School of Mines, testing laboratory of the G. J. McKay 2048

Kinkead ball mill ... 234
bibliography for ... 295
mill ... 235, 276, 1184, 2014
at Goldfield, Nevada, use of the. C. T. Rice. 2038
bibliography for ... 296
number used ... 231
Kirby, E. B., jigs ... 643
systems of ore dressing ... 1184
weight of broken ore ... 1190
weights of ores ... 1179
Kirschner, L., breaking ... 56
Gates and Blake breakers ... 56
gold mills in Europe ... 1173
gravity stamps ... 223
Grundriss der Erzaufbereitung ... xx
Káván-Rittinger and Luhrig tables ... 729
Laszlo's amalgamator ... 787
magnetic separation ... 832
movable sieve hand jig, Harz and Bilharz jigs 639
Pape-Henneberg concentrator ... 839
picking tables ... 492
pointed boxes, *spitzlutte* ... 476
Schranz mill ... 296
slime tables ... 727
three types of rolls ... 109
Kirsten and Labram, greased table ... 831
Klein classifier. F. H. Regel ... 2020
principle of ... 2020
jig, description of the ... 2021
L. A., dressing asbestos ... 1182
moving grizzly bars ... 386
Klein's solution ... 1156
Kley breaker ... 55
Knee-frames for gravity stamps ... 157, 158
Knife for scraping plates ... 762
Knight water wheel ... 1033, 1035, 1089, 1090
Knobs, rolls with ... 104–106
Knochenhauer, B., amalgam ... 788
arrastra ... 290
California stamps ... 225
figures on California gold mills ... 1177
Knop turbine ... 973
Knott dredge ... 1011
Knowles' duplex vacuum pumps at Mill 117 ... 1673
New Century magnetic separator ... 1541, 1568
table of sizes, capacities, speeds, power, weights, etc., of ... 1542
pump ... 872, 914, 922
triplex pump at Mill 117 ... 1674
Knox amalgamating pan ... 776
Koch, E., amalgamating pans on Comstock lode ... 291
capacity of jigs ... 597
Gottesgabe and Hammerwäsche mills in Westphalia ... 1177
jigs at Gottesgabe and Hammerwäsche mills at Westphalia ... 641
stamps in Comstock mills ... 230
stroke of jigs ... 594
H., ore dressing at Tarnowitz, Silesia ... 1186
Kohinoor mill ... 907
Empire Zinc Company ... xxv
Köhler on jigs ... 643
Kolar District, India, cost of producing gold in .. 1981, 1982, 1983
Kolshorn & Streckers grinder ... 232
bibliography for ... 292
Kominor mill ... 2017
Konus breaker ... 2010
Kootenay Ore Company, B. C., the custom mill of the ... 2045
Koppel shoes and dies at Mill 97 ... 1620
Kosmann, Freideberg mill ... 297
Propfe mill ... 297
Kossmann, B., Nicholas pulverizer ... 292
Krause mortar discharge for steam stamps .. 997, 1003, 1256
at Mill 179 ... 1397
pneumatic stamp ... 141
Kreiss jerking conveyor ... 884
Kretschmer, Franz, graphite dressing in Moravia ... 1183
Krogh centrifugal pump at mills .. 1626, 1627, 1633, 1929, 1930
Krom air jig ... 824
belted rolls ... 82
breaker ... 56
movement of jaws ... 34
of Dodge type ... 31
cushioned rolls ... 2010
pneumatic jig ... 824
products from, on De Soto mine ore ... 824
results on Seminole ore ... 821
Krom rolling toggle breaker ... 2010
rolls ... 109, 110, 112, 224, 1182
sectional breaker of Blake type ... 21
S. R. ... 30, 31, 45
advantages of air over water ... 838
and H. Van F. Furman, pneumatic concentration 838
T. A. Blake, improvements by Krom ... 59
boxes for rolls ... 73
breakers ... 57, 59, 60
Cornish rolls *versus* Krom rolls ... 110
stamps ... 112
Krom breaker ... 57
Krom's pneumatic jig ... 839
maker of Rutter breaker ... 45
roll speeds ... 87, 88
tires ... 65
rolls ... 72, 77, 111
sizing test of roll product ... 100
stamps and rolls ... 316
versus rolls ... 230
Sturtevant mill *versus* rolls ... 110, 298
Krupp amalgamating table ... 788
ball mill ... 260, 1280, 2011, 2017
at Mill 128 ... 1714
cams ... 1272
cam shaft ... 1272
concentrating table ... 2022
gyratory breakers ... 1215
high-speed rolls ... 1238
description of ... 1244
magnetic separator ... 2025
mining administration, magnetic plant of ... 1814
picking tables ... 1435
rock breaker ... 1202
roll shell turning device ... 1243
sectional guides for gravity stamps ... 1270
spitzlutten, the ... 1382
tables at Mill 128 ... 1715
tube mills at Mill 118 ... 1677
discharge of ... 1288
Krupp's wearing parts for jaw breakers ... 1221
Krypton, atomic weight of ... 1188
Kubale, Sheppard coal jig ... 643
Kunhardt, W. B. and G. W. Maynard, dressing of iron ores ... 1185
jigging tests ... 643
W. B., breaker and mill separate ... 56
breakers ... 56
Brink and Hübner disintegrator ... 298
buddles, slime tables, percussion tables, and kieves ... 727
capacity of jigs ... 597
corrosion of screens ... 354
crushing concentrates ... 1113
Dingey mill ... 293
drop between jig sieves ... 550
extent of crushing desirable ... 315
general milling ... 1173
gravity stamps ... 223
hand breaking and picking ... 492
Harz jigs ... 639
intermittent discharge ... 584
jig bed ... 576
discharges ... 583
plunger clearance ... 530
jigging unsized material ... 609
length of jig sieves ... 592
life of jigs ... 604
limit of jigging ... 605, 606
Nicholas pulverizer ... 292
ore dressing in Europe ... xx, 1185
pneumatic stamps ... 143
removal of jig tailings ... 588
roll shells ... 109
speeds ... 87
running jigs ... 572
Schranz mill ... 276, 296
settling tests ... 1146
Siemens and Friedrichssegen magnetic separators ... 832
siphon separator, pointed boxes, *spitzlutte* ... 476
slime tables ... 696
slope of jig sieves ... 548
slime tables ... 694
stay boxes for jig discharges ... 551, 585
stroke of jigs ... 594
thickness of jig bed ... 575
trommels and riddles ... 384
wear of jig screens ... 547
width of jig sieves ... 591

Kutscher, E., jigs at Clausthal 643
ore dressing at Clausthal 1186
Kutter formula for flow of water 885

L

Labor cost of 1130
for breakers 51
breaking 50
efficiency, effect on costs 1127
for arrastras 239
canvas tables 701
cleaning plates 758, 760
Conkling jig 503
dredge 898
hand jigs 499
Hooper air jig 824
jigs 507, 604
mills 1101
pan amalgamation 250
trommels 361
settling tanks 459
stamps 206
washing pans 333
in the mills 1931
required at crushing plant of Mill 174 1883
mills ..1619, 1621, 1622, 1628, 1633, 1639, 1656, 1664, 1676, 1678, 1685, 1688, 1698, 1705, 1709, 1712, 1730, 1739, 1745, 1757, 1759, 1761, 1764, 1768, 1786, 1791, 1793, 1801, 1816, 1817, 1820, 1827, 1830, 1835, 1841, 1848, 1852, 1856, 1871, 1881, 1887, 1890, 1918, 1920
by sampling department at Mill 174 1884
wage scales at mills..1619, 1621, 1622, 1626, 1629, 1633, 1657, 1664, 1676, 1678, 1680, 1685, 1687, 1688, 1690, 1698, 1705, 1712, 1730, 1745, 1757, 1762, 1764, 1794, 1804, 1816, 1820, 1830, 1841, 1848, 1852, 1859, 1865, 1881, 1919
Laboratory breaker, Case 1204
ore grinder. McKenna 1285, 1323
slime table. H. S. Munroe 2023
tools for testing 1137
Labradorite, specific gravity of 1189
Labyrinths 447, 476
La Cananea, concentration at. M. Schwerin 2037
mining camp. D. E. Woodbridge 1923
Lacing for belts 1093
Ladder for dredges 1008
Lady Barkly mill, weight of stamps in 190
La France Copper Company 1836
Lagging for belts 1093
Lagrange colliery, air blast at 837
Lake City, Colorado, mill at 935
Harold stamp mill 1178
Superior, center discharge at 582
Collom jigs at 515
concentration methods. R. R. Robert 2040
copper mills ..114, 475, 1085, 1093, 1098, 1108, 1109, 1113
disposal of concentrates in 586
mortar blocks in 148
T. A. Rickard 1419
mines, copper handbook 1925
rock, settling slimes from 458
size of grizzly used for 340
cost of die, etc., at 121
milling at 1130, 1131
district, cost of producing copper in 1948, 1949, 1950
hammers used 10
hog-trough classifier 390, 476
hydraulic classifier, products of in Mill 46 ... 391
Mill 45 391
iron ores 1054
works spindle breaker wearing parts 47
jigs 517
life of Collom jigs at 604
magnetic concentration at 833
method of feeding jigs at 549
milling practice. A. S. Atkinson 2041
mills. T. A. Rickard 1997
mills at..1089, 1102, 1174, 1175, 1184, 1183, 1186, 1997
automatic discharge in 577
native copper mills 1103
disposal of concentrates in 587
size of grains in 693
ore dressing, improvements in 2037
region, drop hammers used in 12
steam hammers used in 12
Lake Superior, rock houses 485
slime tables at 697
stamp mill, power used at 310
Lake View mill, Australia. A. G. Charleton..... 2035
Lakes, Arthur, American pebbles for tube mills 2015
arrastra 2013
H. E. Woods testing plant 2048
Standard mill, Idaho 1183
Lamar, J. R. de 284
Lamarche and Schwarz coal jig 641
Lamb automatic tailings sampler 1573, 1609
H. M., mining in British Columbia 2035
M. R., cyaniding at Goldfield, Nevada 1922
the Combination mill, Goldfield, Nevada 2038
Lamberton mill 234
bibliography for 295
Lamprecht, R., breakers 56
Brown's spindle breaker, Wolf's jaw breaker 56
Carr disintegrator 298
classifiers for coal 476
coal jigs 574
coarse and fine jigs for coal 639
cone mill 292
Die Kohlenaufbereitung xx
grizzlies, riddles, and trommels 384
revolving and belt tables 492
rolls for crushing coal 109
Lancaster breaker 59, 60
Company, James H., Lancaster rotary pumps 1589
J. H., the Lancaster gold amalgamator..... 1520
Land pebble phosphate 895
Co., mill ..... xxv, 897
Landis, H. K., blende mills in Missouri 1179
hand jigs and Harz jigs 642
jigs at Friedensville, Pa. 642
Yeatman hydraulic classifier 477
zinc ore dressing at Friedensville, Pennsylvania 1178
Landolt and Bornstein xx
tables 1188
Lane Chili mills 2014
milling practice with the 2016
J. A. Stewart 2015
slow-speed mill 1280, 1308
at Bonita Mining Co.'s property..... 1309
Langerfeld, A., new coal picker 2021
Langguth, E., history of magnetic separation 2031
magnetic properties of minerals..... 837
Langley's crusher, bibliography for..... 296
dry crusher 274
improved dry crusher 234
Lannisdorf, centrifugal machine at..... 820
Lanthanum, atomic weight of 1188
La Point Flour Gold Separating Company, the C. A., suspended riffles 1509
gold separators, table of sizes, capacities, and weights 1510
Lard 1097
Largest size of concentrates saved in the mills 1119
tailings in the mills 1119
Laschinger's formula for average grain 1293
Last Chance mill ..... xxvi, 945
Laszlo amalgamator 777
Lateral thrust, right and left hand cams 195
Latrobe steel die rings and roller shells, life of in mills 1728, 1749, 1771, 1773
wearing parts of Huntington mills, life of at Mill 139 1753
Latta & Martin Pump Company, displacement pump 1589, 1610
at Mill 144 ..... 1590, 1779
Lattes, O., ore dressing at Przibram 1177
Laumontite, specific gravity of 1189
Launders 872, 1592
at Mill 152 1812
bibliography for 885
Blue's experiments with 1594
distributing or sizing 1417
description of pipe. C. W. Van Law 1609
design and flow of sands. F. K. Blue 2032
flow of sand in. F. K. Blue 1609
for amalgamated plates 743
canvas tables 700, 701, 702
shunting 1109
spitzkasten 449
hydraulic mean depth 876
in the mills 874
linings for 1595
mean velocities of water in 877
on Linkenbach slime table 691
Overstrom's experiments with 1592

Launders, pipe launders at Guanajuato 1595
plate glass launder linings at Mill 173..... 1595
quantities of water in 878
rectangular 877
skimming as applied to clarifying tanks..... 1409
speed of water current necessary to carry sand . 878
theory of flow in 876
wetted perimeter 876
Laurenburg, Prussia, hand picking at 492
jigging at..... 609
mill at.....961, 1086, 1116, 1177
sieve scale at 367
picking at 487
running jigs at 572
Schranz mill at 276
Laurium, Greece, magnetic separation at 812
Lautenthal, classifier at 479
hand picking at 492
jigging at 609
jigs at 643
mill at 1086
picking at 487
range of sizes at 609
sieve scale in mill..... 367
Lawrence, H. L., dressing zinc blende and magnetite at new Pierrefitte mines, France 1182
Machine Co., centrifugal pumps 869
Laws of classifying 464
bibliography for 475
crushing 300, 1325
bibliography for 315
conditions under which crushing is effected 1326
fineness of the desired product 1325
nature of material crushed 1325
power required for crushing..... 1334
relative efficiency of regrinding machines.. 1331
sources of lost power 1325
free-settling particles, method of investigation of, in surface current box classifiers .. 434
results of investigation of, in surface current box classifier 434
jigging 610, 1460
bibliography for 639
L. C. Trent and Company 270
Leach, A. H., picking belt of steel wire screen 492
Leaching, bibliography for..... 1173
copper ores 1167
for wolframite 829
in tin ores 1081
silver ores with hyposulphite..... 1167
Lead amalgam 730
separated by hot straining 781
and silver ore, crushed by Blake breaker and Chili mill 271
atomic weight of 1188
bullets for jig bed 1081
City, South Dakota, mill at 1025
cost of producing.....1960, 1968
ores, mill for ...893, 900, 908, 909, 910, 911, 913, 915, 916, 926, 928, 935, 958, 961, 965, 1004, 1005, 1015, 1065, 1066
size of grizzly used for 340
treated at Mills 24, 25 69
by revolving knife buddle..... 329
removal of 251
shot for jig beds 574
tests on velocity of 626
-silver ores, mills for 925, 936
specific gravity of 1189
-zinc mill, outline of a. W. R. Crane 2041
ores, mills for 1120
Leadville, Colorado, filter bins at 1570
mill at 909, 910, 1069, 1179
mining district. T. Tonge 2035
roasting for magnetism at 814
Gold and Silver Extraction Company mill..xxix, 1070
Leakage of magnets 793
Leather belts..... 1093
Leavitt, E. D., Jr. viii
pump designed by..... 872
steam stamp ..114, 115, 116, 118, 119, 120, 121, 122, 123, 124, 126, 127, 128, 131, 132, 133, 134, 142
at Mill 177 1892
mortar jig 993
valve motion 124
Lebanon plant of the Pennsylvania Steel Company.. 1828
Le Chatelier, decomposition of siderite 1544
Ledoux, A. R., figures on sampling 852
rules for sampling 849
Leffel turbine wheel.....916, 939, 1024, 1052, 1053, 1089
Le France Copper Company, copper handbook 1925
Leggett, Thomas H., diamond washing in South Africa 1178
pans 335
weathering at Kimberley, South Africa 839
Lehigh Mountain ore, magnetic separation of 810
Zinc & Iron Company, cost of screens 361
Lehman, F., washing of clays at Chicago 1178
Leighton, George, dressing phosphate in South Carolina 1183
magnetic separators 1528
Lemières coal jig 643
Length and slope of trommels..... 378
of amalgamated plates 740, 744
jig sieves 592, 599
stroke of Card tables at mills 1660, 1830
Evans jigs at mills 1837, 1838, 1843, 1844, 1845
feeder at Mill 125 1700
Frue vanners at mills ..1625, 1627, 1662, 1711, 1712, 1755, 1844, 1865
greased tables at Mill 188 1921
Hancock jigs at mills 1710, 1846, 1869
Harz jigs at mills.....1692, 1693, 1694, 1701, 1702, 1703, 1725, 1728, 1744, 1750, 1751, 1752, 1753, 1772, 1773, 1774, 1775, 1829, 1837, 1843, 1854, 1855, 1869, 1877, 1878, 1879, 1885
Hodge jigs at mills 1902, 1903, 1904, 1905, 1909, 1910, 1911
jigs 594
at mills...1685, 1686, 1707, 1708, 1858, 1929
Johnston vanners at Mill 167 1858
mortar jigs at Mill 177 1892
Overstrom tables at mills.....1711, 1712, 1730
plunger feeders at mills..1749, 1750, 1751, 1857
shaking feeders at mills..... 1691, 1868
grizzly at Mill 124 1690
launders at mills 1693, 1694, 1761
simple steam stamp at Mill 182 1909
Sutton, Steele, and Steele dry table at Mill 151 1803
Triumph vanners at Mill 101 1627
vanners at Mill 122 1687
Wilfley tables at mills ..1625, 1633, 1661, 1662, 1669, 1689, 1729, 1738, 1739, 1744, 1745, 1754, 1829, 1830, 1844, 1855, 1858, 1894
Woodbury-Benedict jigs at Mill 177 1893
concentrators at Mill 117 1669
trommels 349
units of..... 1187
Lenicque, M., testing of ores..... 2048
Lepidolite, specific gravity of..... 1189
Lester breaker 56
Leupold *spitzlutte* 2020
Leuschner magnetic table separator 2031
Levant mill for tin ore 1082
Levelling mortar blocks 147
up Wilfley tables 1468
Lever stamps 1246, 1261
Rapid Economy..... 1261
type of Blake breaker 22
Leviathan conveyor belt 1585
pulverizer..... 236
bibliography of 299
Lewis and Bartlett bag houses 885
J. V., cleaning corundum at Sapphire and Corundum Hill, N. C. 1184
corundum at Corundum Hill, North Carolina 1176
heating and quenching 57
Libbey, W. L., amalgamated plates 765
cost of milling in Nova Scotia 2049
sodium amalgam 753
Liberty Bell Gold Mining Company 1631
mill, Telluride, Colo. A. Winslow..... 2033
Libra scales..... 1605
Lidner, P. G..... 1175
hand picking at Ammeberg, Sweden 492
jigs in Sweden 640
ore dressing in Sweden 1175
roasting a blende ore..... 57
for friability 57
separation processes..... 839
stroke of jigs 594
Liebig condenser for retorts 781
Life of amalgamated plate 741
battery screens at mills 1618, 1624, 1632
belt conveyor at mills 1585, 1631, 1667, 1670, 1710, 1853
belts and buckets on elevators.....863, 864

Life of blanket tables 703
brass-wire jig sieves at Mill 173 ..1877, 1878, 1879
bucket conveyor 861
buckets in sand wheels at Mill 117 .....1668, 1669
Callow screens at mills.....1661, 1662, 1687, 1760
cam shaft..... 190
canvas, blanket, and carpet tables 703
tables 700, 702
centrifugal pumps 870
chilled-iron jaw plates at Mill 161..... 1837
crushing machinery, long..... 2009
dewatering wheels at Mill 173 1878
dies at Mill 103..... 1632
distributors at Mill 126..... 1707
duck for canvas tables at Mill 103 1633
elevator belts at mills.....1632, 1633, 1661, 1667, 1725
buckets at mills.....1632, 1633, 1661, 1667, 1725
parts at Mill 182 1910
El Oro tube mill lining..... 1677
Frenier special sand pump at Mill 126 1708
Frue vanner belts at Mill 127 .....1711, 1712
grizzlies 340
Hancock jig sieves at Mill 127 1710
Huntington mill parts 280
screens at mills 1625, 1686, 1711
jaw plates for Blake breakers at Mill 100 ... 1624
jigs 604
jig screens 546
sieves at mills.....1687, 1707, 1708, 1909, 1910, 1911
Koppel shoes and dies at Mill 97 1620
linoleum top and riffles of Overstrom table at Mill 127 1711
Midvale steel roll shells at mills...1727, 1866, 1867, 1877
open-hearth crucible-steel screens at Mill 178 1896
punched plate trommel screens at mills..1707, 1876, 1877, 1902
retorts..... 782
Robins belt conveyors at mills..1661, 1824, 1825, 1876
conveying and picking belts at Mill 132 ... 1727
roll shells 66
at mills 1688, 1689, 1720, 1724
sand wheels 866
screens..... 174
shoes and dies.....182, 183, 184, 2011
at mills.....1622, 1632, 1668
for gravity stamps 1277
sieves on Hancock jigs 1441
stamp cams 192
guides 156
screens 169, 170
stem 187, 188
tappets 189
trommel screens 352, 362
at mills 1710, 1727, 1728, 1749, 1750, 1751, 1752
tube mill linings at Mill 103 1632
vanner belts 648, 650
wash trommel 332
wearing parts of Allis-Chalmers rolls at Mill 179 1898
ball mills at Mill 159 1828
Blake breakers 27
at mills 1621, 1724, 1749, 1853
breakers 1221
Bryan mills at Mill 173 1879
Buchanan jaw breakers at Mill 157 1818
Butler's centrifugal pumps at Mill 117..1671, 1672, 1674
Byron-Jackson pump at mills 1662, 1673
centrifugal pump at mills 1632, 1633, 1711, 1712, 1856, 1899, 1904, 1905
Chili mills 1898
Cyclone beater at Mill 186 .....1917, 1918
dewatering screen at Mill 126 1708
Dodge breakers 31
drag or disc conveyors 1583
elevators at mills..1707, 1710, 1711, 1727, 1728, 1729, 1749, 1750, 1752, 1753, 1755, 1756, 1818, 1819, 1829, 1853, 1854, 1855, 1877, 1880, 1898
Forster breaker..... 28
Frayer centrifugal pump at Mill 159 ... 1829
Gates breaker at mills..1661, 1706, 1716, 1727, 1828, 1853
Griffin mills at Mill 105 1636
grinding pans at Mill 105 1638
Life of wearing parts of Hodge and Cleaves sand jigs at Mill 182 ..... 1910, 1911
jigs at Mill 180 .....1902, 1903, 1904, 1905
Huntington mills 1317
at mills.....1669, 1687, 1689, 1711, 1753
Knowles duplex vacuum pump at Mill 117 .....1673, 1674
Krogh pumps at mills 1626, 1633
McCully breakers at Mill 139 .....1222, 1749
Monadnock Chili mills at Mill 144 1775
Nordberg steeple-compound steam stamps at Mill 180 .....1901, 1902
rolls at mills 1244, 1685, 1686, 1707, 1710, 1749, 1750, 1751, 1752, 1771, 1773, 1774, 1854
scraper conveyor at Mill 126 1709
Sherman Huntington mills at Mill 132 .. 1728
spindle breakers 46, 47
stamps at Mill 118 1677
Traylor centrifugal pumps at Mill 114 .. 1662
trommels at Mill 166 .....1853, 1854, 1855
Waddell Chili mills at Mill 174 1886
Wetherill magnetic separators 1525
Wilfley tables at Mill 126..... 1708
wire rope 1095
Lifting magnets, Eastwood improved..... 1532
Lift of elevators 863
Light for hand picking 481
Lighting 1100
mills 1931
Lightner mill..... 235
bibliography for..... 296
Lignite as fuel for roasting furnace 1549
Lime. See also Quicklime.
as a precipitant for slimes 1416
crust on plates 767
for acid water 1105
coagulating slimes at Mill 185..... 1915
settling 458, 459
slimes 1026
at Mill 106 .....1416, 1641
Caldecott on 1416
in Arizona copper mills..... 1416
used in amalgamation 751
investigating classifier currents 434
settling tests 1147
slimes 1149
to remedy acidity in stamp mill 749
Limestone, Missouri, jaw plates used in crushing .. 48
Limestone to remedy acid water..... 751
strength of.....301, 302
weight of..... 1190
Limit of concentration 1118
crushing 303
hand picking tests 1164
screen sizing 1361
settling 455
sizes treated by jigs 604
Limits of drop in stamps..... 216
sieve scale 368
to number and height of drop of stamps..... 218
Limitations of the hydraulic classifiers 1368
Limonite. See also Iron.
concentrated by Bradford jig..... 502
concentration of 1054
magnetic separation of 809
results of classifying in Mill 5 405
separated by magnets 790
specific gravity of 1189
washer.....xxv, 895, 896
weight of..... 1190
Lincoln mill, dies used in..... 180
Linder, S. E. and H. Pictou, action of arsenic sulphide solution on electrodes 1178
powers of metallic salts on arsenious sulphide 1178
Lindgren, W, amalgamating pans, Boss system at Calico, California 290
placer mining 2041
Liners, El Oro tube mill 1286, 1291, 1340
cost of 1287
Lines of force, magnetic 791
Lining, discussion of iron tube mill..... 2016
for Abbé tube mills at Mill 101..... 1626
amalgamating pan 244
cars..... 1113
centrifugal pumps 869
gravity stamp mortars 166
jigs 527
launders 872

Lining for ore bins 842
steam stamps 120
tube mills. A. E. Drucker 2016
at Bodie, Calif. W. W. Bradley 2016
Mill 103 1632
Link belt conveyors 860
Company elevator at Mill 125 1702
elevators 862
Linkenbach, C. ..... xx, 332
Blake breakers 56
breakers and hammers 56
bumping tables and slime tables 727
capacity of trommels 359
classifier feed 389
spigot 388
cobbing 480
concave slime tables 692
density of pulp for slime tables 695
drop between jig sieves 550
figures on limits of sieve scale 369
spiral screen 363
gravity stamps 223
hammers for breaking 11
hand breaking and picking 492
Heberli mill 259, 292
jig discharges 583
plungers 529
jigs for two mineral separation 589
labor for jigs 604
life of jig screens 547
limit of screening 369
sizes jigged 605, 606
Linkenbach slime table 728
magnetic separators 832
mill schemes 1173
number of sieves for jigs 590
pointed boxes 412, 416, 441, 476
power for crushing 315
ratio of sieve hole to jig feed 573
rolls 109
roll speeds 87
Schmidt spiral screen 363
sieve scale, grizzlies, trommels, and spiral screens 384
sizes treated by slime tables 693
skimming jigs 576
slime tables 697
slope of jig sieves 548
slime tables 694
spalling and cobbing hammers 11, 56
stroke of jigs 594
use of box classifiers 433
V-box classifier 421
velocity of current in classifiers 434
wash trommel 334
fixed conical tables 689
slime table 690
tables at Mill 146 1785
Mill 147 1790
Linnaeite, specific gravity of 1189
Linoleum cover for deck of New Standard concentrator 1479
table decks 1467
Wilfley table 672
Linton's level 1159
Lintorf, Prussia, disintegration and screening at 830
jigs at 641, 642
limit of sizes jigged at 605
mill at 1177, 1179
stroke of jigs at 594
Vapart disintegrator at 289
Lion mill 234
bibliography for 294
Lip apron for stamps 178
plates 739
Liquation in bullion 785
Lisburne mines, Wales 329
List of minerals floated by flotation processes 1555
List of good and poor conducting minerals for electrostatic separation 1550
Liter, equivalents of 1187
Lithium, atomic weight of 1188
Little Giant quartz mill 1281, 1310
Lixiviation 1616, 1676
bibliography for 1175
Loam, M., Husband stamp 143
Location of amalgamated plates 737
machines in mills 1109
main shaft for stamps 197
mills ..... xxv, 1085
Lock, A. G., amalgamating pans 290
amalgamation 787
breakers 56
Dunham's and Patterson's spring stamps, Sholl's penumatic stamp 143
Fisher's stamp mill 142
Frisbee Lucop mill 294
gold xx
from sands and from vein rock 1173
gravity stamps 223
Harz and Bradford jigs 639
Howland pulverizer 297
Jordan's pulverizer 299
placer gold concentration 837
pointed boxes, *spitzlutte* 476
several breakers 56
Thompson's pulverizer 294
C. G. W., gold milling xx
milling in Black Hills, South Dakota 1182
pan amalgamator 789
stamping, amalgamating, and concentrating gold 1173
Locke, C. E. ..... viii, 477
Lockhart's automatic gem separator (classifier) 430
tubular classifier 476
Loevy, J., definition of slimes 1398
Logarithmic plot of sizing tests 1139, 1144
Log washers 55, 320, 1065
at mills 895, 1617, 1815
bibliography for 334
Crickboom, at Mill 147 1787
horizontal logs 328
Thomas 324, 335
Turbo 1341
versus wash trommels 333
washing plant 335
at Longdale, Virginia 335
Lohnert's ball mill 293
Longdale, Virginia, limonite washer at 896
log washers at 335
mill at 1175
classifier at Mill 155 1369
Iron Co., clarifying reservoir 461
mill 1816
reservoirs for tailing 477
log washer 322
Longfellow concentrator, water required at 1931
Longitudinal partition for jigs 524
Longridge, C. C., gold dredging in rivers 1179
hydraulic mining ..... xx, 1006, 1173
probable development of stamps 229
river dredging 2036
Long ton 883
equivalents of 1187
Loram, S. H., amalgamating pans 788
Lord & Banfield, dry placer machine 839
dry separator 2030
Loring, recovery of waste in stamp mill 266
vanner belt 647
W. J., amalgam at the Utica mills 788
amalgamated plates 757
gravity stamps 224
life of steel shoes 184
mercury fed to stamps 208
mortar linings 166
stamp mills at the Utica stamp mills, California 1176
stamp mill practice in California 2033
shoes 181
Loss in friction 1098
melting 784
steam transmission 1091
weight in retorting 783
wire rope transmission 1095
of gold 786
mercury. See Individual Gold mills in Chapter XX.
mercury 786
at Mill 114 1663
in amalgamating pans 250
oil in separation 831
Losses in concentration 892
dry concentration 825
fines 1119
magnetic concentration 1054
milling 1945
plate amalgamation 749
slimes 1121
stamping pyrite ores 1047
tailings 1171, 1172

Losses of iron and mercury in pan amalgamation... 249
on amalgamated plates 747
slime tables 693
vanners 656
Louis, H. 142, 167, 200, 839
amalgamated plates.....735, 747, 750, 753
amalgamation 787
amalgams 731
arrastra 238, 290
Blake, Dodge, and Gates breakers 56
Chinese stamping machine 224
connecting table with mortar 735
crushing machines 316
design of cams 197
economy of stamp blow 220
efficiency of stamps 219
gold milling xx
gravity stamps.....223, 224, 226
grizzlies 384
hammers for breaking 11
Huntington mill 297
Krom rolls 109
mercury wells 768
nature of amalgam 208
pointed boxes 476
power for stamps 204, 205
retorting 781
size of stamp feed 207
spring and pneumatic stamps 143
stamp frames 153
mortars 164
stems 187
tappets 188
stamping, amalgamating, and concentrating for gold 1173
tables for supporting plates 733
use of sulphuric acid on plates 752
water used in stamp mills 222
weight of stamps 219
Lovett-Finney magnetic separators.....832, 833, 835
Lowe, F. A., amalgamating pans at Batopilas, Mexico 291
concentration of silver lead ores 1922
stamp mill at Silver Islet mill, Lake Superior 226, 1179
Lowe's mill 233
bibliography for 294
Lowry breaker 58, 59, 60
National breaker 45
Lubrication 1097
and care of journals 1930
of amalgamating pan 247
cams 194
cam shafts 191
stamp guides 156
wire rope 1095
Lucknow, New South Wales, mill at 1181
plates at 788
Lucop & Cook mill 294
Ludlow, E., report used by Choctaw Coal and Railway Company..... 1180
Ludlow-Saylor Wire Company, wire cloth screens .. 1366
Ludwigseck mine, magnetic concentration at 837
Luhrig and Coppée coal washing plant..... 2051
Buss concentrating table..... 1492
jig.....538, 640
scraper for removing tailings 588
picking table. C. Blömeke 2021
slimer 1496
table 669
capacity of at Diepenlinchen, Prussia 670
type tables at Mill 134 1734
vanners at mills 1717
Luhrmann, F. W., Pfeiffer's mill 295
Luipaards Vlei Estate, ore reduction plant of 1645
Lumber for mills, cost of 1125
Luquer, L. M., minerals in rock sections xx
separation of minerals by solutions 1173
Lurmann, separation processes 836
Luster affecting separation 889
of minerals, effect of 3
Luting retorts 781
Luttermann, rolls at Clausthal 110
Lye, use of on amalgamating plates in California .. 1619
used in amalgamation 751
Lyon mill, amalgamating pan.....241, 243, 244, 246
heat used in amalgamating in 248
wings of amalgamating pans in..... 245
Mountain, Conkling jig at 503
mill at.....901, 1175, 1185, 2035, 2039
methods at the 2046

M

Mace mill 1685
Machine breakers 13
breaking..... 56
distributors 857
oil 1098
shop for mill 1087
Machinery at Paris Exposition, exhibition of 2009
Reichenberg Exposition, exhibition of 2010
cost of 1123
crushing and grinding. Philip Argall 1278
principle and operation of crushing and grinding. James Douglas 2017
Machines, arrangement of 1107
design of 1096
guarding work of 1111
in series and in parallel 1110
Macquisten, A. P. S., flotation process 1555, 1563
flotation process. W. R. Ingalls 1569, 2027
at Golconda, Nevada.....1555, 1565, 1611
Mill 149..... 1564
Coates tubes 1563
water flotation process. F. C. Nicholas 2046
Mactear, J. A., penumatic concentration 838
Madison mill 1024
of the Utica Company xxvii
Madrid, New Mexico, electric power 1092
Magalia drift mill, plates in..... 789
riffles in 770
Magic crusher..... 236
bibliography for 299
Magnesite, specific gravity of 1189
Magnesium, atomic weight of 1188
Magnet for testing 1156
Magnetic combination mills 1060
concentrating mills..... 1053
concentration 790
at Broken Hill 1569
Cañon City, Colorado. P. Barker..... 2043
Monteponi, Italy. E. Ferraris 2046
cost of 1135
principles of magnetic separators 1521
roasting before 1544
the Hibernia mill, New Jersey 2040
field 791
attractability of substances in 796
mill at Lyon Mt..... 2035
Monteponi 1068
ore, Port Henry, products of crushing 100
separation. See also Roasting for Magnetism.
at Broken Hill, Australia 2034
D. Clark 1568
Creede, Colorado 2044
mills 1663, 1735, 1741, 1793, 1810
Mineville, N. Y.....2040, 2047
Port Henry, N. Y. F. Cirkel 2034
the Joplin Separating Company mill 2038
Krupp mining administration 1814
London mill, Australia 2045
bibliography for 832
H. Lunto 2030
H. Smits 2026
history of. Witter 2031
F. T. Snyder..... 1568
in Cornwall. E. Skewes 1037
Finland. G. Gröndel 2047
Hungary, dry and wet. C. Blömeke..... 2040
Sweden..... 2047
K. G. Brunnberg 2040
of hematite and magnetite. Dr. Weiskopf... 2047
iron ores in Sweden. G. W. Peterson..... 2047
tin oxide and wolfram..... 2027
and copper ores in Cornwall..... 2040
and wolfram. E. Treloar and G. Johnson 2028
zinc iron sulphides. G. H. Elmore 2042
ores in Wisconsin. H. A. Wheeler 2042
references to 2028
review of. H. Wedding 2028
roasting zinc ores for..... 2030
versus flotation process for zinc ores. E. Laughton 2029
with Wetherill's 804
separators at London mill, Queensland, Australia 2042
mills....1741, 1763, 1765, 1808, 1810, 1815, 1862, 1863, 1891, 1916
Monteponi. E. Ferraris 2028
Balch 834
Ball-Norton.....1527, 1923
or Monarch..... 797

Magnetic separators, Blake ... 833
Bromilow ... 836
Buchanan ... 803
C. Blömeke ... 2026
Chase ... 832, 833, 835
classification of ... 796, 1521
Cleveland-Knowles magnetic separator ... 1542
at Mill 148 ... 1792, 1793
cobbing magnets ... 1531
comparison of. W. A. Anthony ... 2026
Conkling ... 809, 810
construction of ... 2030
Cranberry magnet ... 1530
Dellvik Gröndal ... 804
description of different types of. C. Bugge ... 2030
Dr. Weiskopf ... 2030
H. C. McNeill ... 2026
M. Lenicque ... 2026
O. Simmerback ... 2030
S. W. Osgood ... 2027
Dings ... 1540
Edison ... 810, 812
Eriksson's electromagnetic separator ... 1529
F. Schiff ... 2028
Ferraris ... 799, 1525
drum-type ... 1528
for black sands. C. C. Longridge ... 2028
Forsgren's electromagnetic separator ... 1538
full description of different types of ... 2028
Gröndal Nos. 2, 3, 4, and 5 ... 1537
Heberli ... 799
wet ... 810
Hoffman ... 832, 835
Hughes Daviot ... 812
Humboldt ... 1530
in a lead zinc plant ... 2047
Cornwall ... 2028
International ... 1533
Kessler ... 811
Knowles' New Century ... 1541, 1568
Leighton ... 1528
Lovett-Finney ... 832, 833, 835
Mechernich ... 1535
Payne ... 799
primary-magnet type ... 1521
principles of ... 1521
Rowand ... 807
secondary or induction magnet type ... 1521
Siemens ... 803, 834
& Halske ... 798
suited for testing ... 1993
theory and conditions of. E. Langguth ... 2031
Trustedt ... 835
Ullrich ... 1535
used at Przibram ... 812
Monteponi ... 810
using drums ... 797
Vial ... 835
Waring at Mill 148 ... 1792
Wenström ... 800
wet ... 804, 810
Wetherill ... 804, 1521
with conveying belts ... 804
no moving parts. O. A. P. Srufeldt ... 2026
ore falling in front of magnets ... 812
treatment of a high phosphorus iron ore ... 2047
blende and barite. C. Blömeke ... 2025
iron ore in Sweden. G. W. Peterson ... 2038
by the Gröndal process. P. McBennie ... 2025
Magnetism ... 891, 1053, 1611
calcining for ... 1544
change of by heat ... 4
effect of ... 4
carbon in roasting for ... 1544
on free settling ... 465
roasting for ... 813, 890, 1544
a blende-marcasite concentrate for. H. O. Hofman ... 2027
F. H. Trego ... 1568, 2027
N. S. Keith ... 2027
W. B. Phillips ... 2027
unit of ... 791
use made of, in mills ... 890
Magnetite, concentrated on Conkling jig ... 503
deposits of New York ... 1923
for jig bed ... 574
hindered-settling test on ... 617, 618
mill for ... 1055, 1058, 1059
ores, mills for ... 901
separated by magnets ... 790
Magnetite, separation of in Finland ... 804
settling velocity of ... 466, 469
specific gravity of ... 1189
Magnetomotive force ... 792
Magnets. See also Electromagnets.
Bilharz cobbing magnet ... 1532
Broughton Asbestos Company magnet ... 1532
cobbing ... 1439, 1531
Eastwood improved litfing magnet ... 1532
heating of ... 795
leakage of ... 793
Manhattan Asbestos Company magnet ... 1531
of Wetherill separator, proper distance apart for ... 1524
relative attraction of various substances ... 796
when applicable ... 790
Mahanoy City, shaking screens for coal ... 342
Maiern, Austria, hand picking at ... 487, 493
magnetic separator at ... 798, 836
mill at ... 1185
roasting for magnetism at ... 815
Main, Wm. Jr., gravity stamps ... 226
stamps ... 229
shaft for gravity stamps ... 197
location of ... 197
Maintaining height of drop in gravity stamps ... 200
plates of the right consistency ... 756
Malachite, specific gravity of ... 1189
Malay Peninsula, tin dressing in ... 1084, 1182
Malleable iron elevator buckets at Mill 136 ... 1737, 1738
Mallet for settling concentrates ... 1113
Mammoth, Arizona, screening tests on gold ore at ... 284
shoes and dies at ... 183
mill, screens in ... 175
Mining Co., mill ... xxviii, 1045
Utah, mill at ... 1045
Management ... 1947
effect on costs ... 1128
Manganese, amalgam ... 730
atomic weight of ... 1188
ore, the dressing of. E. K. Judd ... 2027
specific gravity of ... 1189
steel. See Wearing Parts.
ball mill linings at Mill 159 ... 1828
for breakers ... 1213
drag conveyor flights ... 1583
roll shells ... 68
toothed rolls ... 1244
wearing parts of rolls ... 1243
Gates' gunlock mantles for gyratory breakers. 1220
jaw plates at mills ... 1749, 1818, 1888, 1889
self-tightening mantles for McCully gyratory breakers ... 1213
trommel screen at Mill 117 ... 1667
Mill 174 ... 1882
wearing parts of Blake breakers at Mill 98 ... 1621
Buchanan breakers at Mill 183 ... 1913
Gates breakers at Mill 114 ... 1661
Manganite, specific gravity of ... 1189
Manhattan Asbestos Company, magnet ... 1531
mill, Krom jigs at ... 838
Mannheim, Brink & Hübner disintegrator at ... 286
Mantey offset for Chili mills ... 1305
Mantles for McCully gyratory breakers, self-tightening, manganese steel ... 1213
Gates' gunlock manganese steel for gyratory breakers ... 1220
Marcasite, roasting for magnetism ... 1544
specific gravity of ... 1189
Mardin, E. M., amalgam ... 789
Marsaut, J. B., jigging plants ... 641
separation by jigs ... 643
Marsden breaker ... 56, 58, 59, 60
Marshall Basin, Colorado, Browne hydrometric sizer at ... 410
vanners at ... 658
Creek ... 1015
Martin Iron Works breaker ... 2009
Martin's buddle ... 1090
Maryland, mills in ... 1175
Mining Company mill ... xxvii, 1019
Marysville, Montana, Blanton cams at ... 194
mill at ... 1027, 1040, 1181
Massachusetts Institute of Technology, testing machines at ... 1137, 1156
tests on distribution of amalgam ... 764
effect of temperature on amalgamation ... 767
Materials for amalgamating plates ... 747, 1514
drag or disc conveyor flights ... 1583
gravity stamp guide blocks ... 1267
grizzly bars ... 339
Harz jig bedding at Mill 183 ... 1913

Materials for Huntington mill parts 280
jig tanks 522
screens 574
mortar linings 166
riffle cleats 1467
roll shells 66, 68
at mills 1716, 1720, 1913
round table decks at Mill 162 1846
screens 354
and cost 173
in trommels 350
shafts 351
stamp batteries 1277
bosses 186
guides 155, 156
parts 225
at Mill 143 1769
tappets 188
surface of Rittinger table 668
of slime tables 688, 695
tube mill linings 1287
wearing parts of Blake breakers 26
at Mill 166 1853
breakers 48, 1220
centrifugal pumps at Mill 103 ..... 1632, 1633
Cyclone beaters at Mill 186 ..... 1917, 1918
Dodge breakers 31
at Mill 183 1913
elevators at mills .. 1822, 1824, 1825, 1853, 1854, 1855
fans at Mill 186 ..... 1917, 1918
Gates breakers at Mill 166 1853
Hodge and Cleaves sand pumps at Mill 182 ..... 1910, 1911
Huntington mills at Mill 161 1839
McCully breakers at Mill 139 1749
Nordberg steeple-compound steam stamps at Mill 180 ..... 1901, 1902
rolls 1243
at Mills 1737, 1738, 1742, 1743, 1843, 1844, 1854
screens at Mill 158 1824
spindle breakers 46, 47
steam stamps 121
trommels at Mill 165 1851
Waddell Chili mills at Mill 174 1886
of belts for gravity stamps 197
bottom bed on jigs 573
bucket elevators 863
cam shaft 191
dies 180
jig screens 545
mortar blocks 145
screens 169, 170
shoes and dies 182, 183, 184
stamp cams 192
screens 173
stem 187
tappets 189
Mathet, De Gournay and Suisse, Hochstrate apparatus 837
Mathey roasting furnaces at Mill 148 1792
Mathez, A., on drop of stamps 220
Mathines Creek, Huntington mill at 281
Maurice, P. E., jigs 642
motion of solid particles in a liquid 477
centrifugal coal washer, results from 2050
Maximum profit in concentration 1118
size of feed to rolls 63
ore treated by Wetherill magnetic separator . 1525
Maxwell's law of magnetic field 791
May Brothers' jigs at mills 1714, 1717, 1720
W. J., close sizing before jigging 2022
concentrating iron ores 1179
Mayflower drift mill, mercury wells in 789
riffles at 770
mill, amalgamated plates in 740, 752
pan concentrator at 683
shaking screen in 342
unwatering box in 450
Maynard, G. W. and W. B. Kunhardt, dressing of iron ores 1185
jigging tests 643
May's jig 643
McCabe & Company, New Standard classifier 1373, 1419
McCallum, A. C., design of mining machinery 2048
rolls, crushers and mortars 1178
strength of machines 1096
McClave, J. M., an electrostatic separator 2028
the Wilfley roaster 1569
McCormick, E., Calumet and Hecla mill scheme .. 1184
S. G., gold ores at Ouro Preto mine, Brazil 1182
McCully breaker 55–59, 2010
compared with Gates 45
gyratory breaker 44, 1210
at mills 1222, 1749, 1805, 1831, 1866
life of wearing parts at Mill 139 1222
manganese steel self-tightening mantle for . 1213
McDermott, W. 1362
amalgamated plates 741
and P. W. Duffield, amalgamated shaking plates 787
gold amalgamation ..... xx, 1173
Baltic mill, Michigan 2041
capacity of Calumet classifier 401
concentration and amalgamation of silver ... 1175
Eureka Hill mill 2029
hand concentration test 2049
standardization of screens 2019
tin dressing in Bolivia 2040
McDonald, B., Browne hydrometric sizer 410
double discharge 209
gold stamp mill at Gibbonsville, Idaho 1181
mining report xx
screens 175
size of stamp feed 207
stamps at Gibbonsville, Idaho 227
weights of ore 1190
before and after crushing 1174
McDougall type roasting furnace 1546
McDowell, F. H., concentration at the Tilly Foster mine 833
Conkling separator at the Tilly Foster mine 833
Tilly Foster magnetic plant 1175
McFarlane & Co., design of cams 196
Manufacturing Company, parallel rolls 1244
mortar bolts 150
parallel rolls, description of 1232
rolls 72, 76
at Mill 142 ..... 1766, 1767
stamp frames 153
McKenna Brass Company, laboratory ore grinder .. 1285
laboratory ore grinder 1279, 1285, 1323
McLanahan and Stone Company, iron ore and phosphate washing 1244
log washer 324
single-roll crusher at Alleghany Ore and Iron Company 1241
International Phosphate Company .. 1241
description of 1241
table of sizes, power and weights 1241
jig 518, 538, 640
McLeod concentrator 1492
table, tests at Mill 162 1493
McNeill, H. C., magnetic separators and plants in Sweden 835
Means of getting a whole current in settling tanks... 451
Measure, miners' inch 1197
Measurement of mineral particles 1996
ore grains 470
screen openings 1362
Measures of a four-spigot hydraulic classifier with sorting column of 3-inch pipe 403
tables of 1187
Measuring 1160
Mechanical batea 683
cobbing devices 1439
efficiency of sand wheels 1587
ore handling Blaisdell system 1600
samplers 1571
Brunton 1572
oscillating 1575
Lamb automatic tailings sampler 1573
Snyder 1572
Vezin 1572
sampling 846
Brunton sampler 847
cleaning mill between tests 1577
Collom sampler 847
comparison of machines 848
difficulties attending 1575
limit of 1577
moisture samples 1575
principles of 1574
requisites to accuracy in 1575
size of samples 1575, 1576
winnowing effect of air currents 1576
shovel for removal of jig tailings 588
squeezer for amalgam 781
stirring 320

Mechanical trippers for discharging conveyor belts .. 1586
unwatering 879
Mechanism, accelerated, in jigs 533
crank arm 535
for Bartlett table 678
bumping tables 680
Cammett table 677
jigs 510, 511, 517, 519, 534
vanners 646, 651, 652, 655, 657
Wilfley table 672
sliding block 533
Mechernich, classifier at 477
Heberwäsche at 421, 478, 520
jigs at 642
magnetic separator 1535
at Mill 135 ..... 1536, 1736
mill at 1176
process in the Harz 2030
separator, results from the 2031
sieve scale at 367
stroke of jigs at 594
Megraw, H. A., slimes 1419
Meier, E. D., Osterspey jig 642
J. W., automatic feeders at Przibram 884
Dingey mill 293
Heberli mill 292
Luhrig table 670
ore dressing at Przibram 1180
revolving picking table and picking belt 492
Rittinger and Salzburg tables and buddles at Przibram, Stein belt concentrator 729
Schranz mill 296
wash trommel 335
Meihe's pulverizer 236
bibliography of 299
Meinecke classifier 430, 477, 478
work of 461
pointed box at Clausthal 477
spitzlutte 425, 477
stamps at Clausthal 225
Melones Mining Co. mill, Melones, California. W. W. Bradley 2044
Melting bullion 784
Men. See also Labor.
Mercadel, magnetic separation at 835
Merced amalgamated plates at 767
Mercury, absorption of by amalgamating plates 1514
action of 4
amount required to amalgamate copper plate .. 753
antidote for 730
atomic weight of 1188
bibliography for 787
care and purification of 785
effect of heat on cohesion 767
fed to gravity stamps 208
mortars at mills 1620, 1640
for stamps 206
gold in, after retorting 783
after straining 781
in amalgamating pan 249
riffle boxes 724
riffles 770
loss of. See Individual Gold Mills in Chapter XX.
loss of 786
lost in pan amalgamation 249
ore, separated by oil 831
mill for 1074
properties of 730
retained in retort residue 786
sickening and flouring 751
sink for clean-up 266
specific gravity of 1189
sprinkler for 760
traps 768, 771, 1516
Black Hill trap 773
box traps 773
cleaning up 774
Grass Valley trap 774
lined with plate 741
plain transverse troughs or riffles 772
position of 737
transverse with gates 772–773
use and care of 2024
used on dredges 1012
weight of column 1188
wells 768
versus plates 771
Meronitz, Bohemia, weathering garnet rock at .. 831, 839
Merrall, individual mortar 1264
Mill Company, Merrall's stamp mill 1278
Merrall mill 234
bibliography for 296
Merrill, C. W. 1406
cyaniding at the Homestake mine 1419
tailings of Montana Mining Company, Marysville, Montana 1181
effect of temperature on amalgamation 1520
metallurgy of the Homestake ore 1419
treatment at the Homestake mills 2044
cone classifiers at Mill 104 1634
cones at Mill 106 1371
cylindrical clarifying tanks 1406
at Mill 106 1642
definition of slimes 1399
filter press at mills 1635, 1642
large cone classifiers 1406
at Mill 106 1640
slime cones, finishing cones, and water cylinders 1367
small cone classifiers 1371
at Mill 106 1641
Merrill's mill 1310
Mesabi iron ores, washing plant for 1815
ores, concentration of. H. H. Stoek 1344
Meshes in screens, values of 1196
Mesquital, Mexico, mills at 1182
Metal riffles, expanded 772
Metallic Extraction Company, capacity of rolls 103
plant, Argall four-tube drier at 1600
Metallurgical tests 1167
treatment, problems involved in 1943
Metallurgy, defined v
Metals, specific gravities of 1188
Meter, equivalents of 1187
Methods of crushing 8
dressing and cleaning plates 757
feeding gravity stamps 207
jigs 548
preliminary crushing 9
running five-foot pans in combination mills ... 249
jigs 551
studying mills 1613
testing 1137
working amalgamating pan 248
Metric system of weights and measures 1187
ton 883
Mexican crushing and milling plant, a primitive. F. H. Probert 2038
Mexico, cheap gold milling in. H. T. Collins 2033
cost of producing gold in 1980, 1981
mill in 1180
milling at El Oro. E. Burt 2046
in 2046
ore dressing at Santa Fe. H. T. Collins 2040
silver mill in 1184
Meyer & Charlton, gold extraction at 1647
Gold Mining Company Ltd., mill of 1646
mill details of stamps 221
M. Hoagland Sons and Company 77
Miargyrite, specific gravity of 1189
Mica dressing, general article on. G. W. Colles.... 2027
grinding of scrap 2017
milling of. F. Cirkel 2025
Micas for washing kaolin 1077
Michell & Tregoning pulverizer 233
bibliography of 294
Michigamme iron mine 1135
magnetic separation at 802
mill at 1175
Michigan, cost of milling in 1135
mill, a recently completed 2039
milling copper ore in. C. F. Jackson 2047
mills in 1181, 1182
Micrometer caliper, Snyder 1362, 1366
gauge 1159
for measuring grains 1138
microscope 1363, 1996
Microscope 1160
micrometer for measuring grains 470, 1146
the Ultra 1419
for the study of slimes 1401
Middlings, crushing of 1119
defined 318
disposition of 1108
division with concentrates and tailings 1164
on machines 1112
product 892
size of recrushing 1116
treatment of 1121
Midland coal breaker, West Virginia. F. W. Parsons 2051
Midvale Co., steel for shoes and dies 185

Midvale steel ring dies at mills, life of 1728, 1775
roll shell at mills..1701, 1727, 1750, 1751, 1752, 1771, 1772, 1773, 1774, 1803, 1837, 1838, 1854 1866, 1867, 1877
trunnion tires at Mill 144, life of 1775
Milburn's crushing rolls 111
Mile, equivalents of 1187
Miles, William A., wash trommel 335
Milk of lime, use of at Crown Reef Gold Mining Company's mill 1416
Mill 1.....339, 486, 498, 499, 892, 893, 1113, 1116, 1119
2..10, 319, 339, 486, 498, 499, 522, 892, 893, 1100, 1101, 1112, 1116, 1119
3..24, 64, 66, 87, 498, 499, 892, 902, 1091, 1100, 1101, 1116, 1119, 1129
4.....321, 362, 486, 491, 502, 895, 1116
5...322, 339, 347, 350–352, 358, 405, 480, 486, 491, 873, 879, 895, 896, 1098, 1114, 1116
6.....341, 870, 895, 897
7.....327, 334, 341, 872, 895, 897, 1116
8..... 895, 899, 1116
9..524, 528, 533, 548, 550, 552, 571, 574, 575, 587, 590, 592, 593, 606, 609, 900–902, 1116, 1126
10..24, 26, 64, 66, 72, 76, 90, 91, 101, 347, 350, 352, 358, 359, 361, 366, 524, 528, 537, 540, 545, 547, 550, 552, 571, 575, 587, 590, 592, 593, 596, 599, 601, 603–606, 609, 863, 900–902, 908, 917, 1091, 1100, 1105, 1112, 1113, 1116, 1126, 1129
11.....362, 366, 706, 707, 900, 902, 1116
12..24, 64, 66, 76, 90, 319, 339, 347, 350, 352, 486, 488, 491, 506, 524, 528, 540, 550–552, 577, 604, 865, 900, 903, 1091, 1100, 1103, 1105, 1111, 1116
13..10–12, 24, 26, 47, 339–341, 362, 366, 480, 485, 488, 491, 498, 499, 515, 523, 524, 528, 529, 540, 547, 548, 551, 552, 572, 574, 576, 589, 592–594, 605, 875, 900, 904, 1091, 1099, 1100, 1114, 1116, 1119
14..10, 339, 480, 485, 488, 491, 524, 530, 536, 540, 548, 550–552, 572, 574, 592, 593, 596, 605, 900, 905, 1091, 1116, 1119
15..24, 26, 64, 66, 76, 87, 90, 91, 101, 347, 350, 352, 358, 359, 366, 399, 442–444, 485, 522–524, 528, 530, 533, 537, 538, 540, 550, 552, 572, 586, 590, 592, 593, 604, 605, 684, 689, 696, 863, 874, 875, 900, 906, 907, 1091, 1100, 1116, 1129, 1163
16..24, 26, 64, 66, 69, 73, 76, 87, 90, 91, 97, 101, 347, 350, 352, 354, 358, 366, 524, 528, 534, 540, 545, 546, 549, 550, 552, 570–572, 579, 592, 593, 604, 605, 863, 893, 906, 908, 1091, 1105, 1111, 1116
17..12, 24, 26, 64, 66, 69, 72, 76, 90, 91, 97, 101, 347, 350, 352, 354, 358, 366, 400, 480, 486, 524, 528, 534, 540, 547, 550, 552, 584, 590, 592, 593, 596, 599, 605, 863, 893, 906, 908, 1091, 1105, 1111, 1116
18..24, 26, 64, 66, 76, 90, 101, 347, 350, 352, 358, 366, 369, 373, 410, 444, 522–525, 528, 530, 533, 537, 538, 540, 550, 552, 590, 592, 593, 604, 648, 863, 906, 909, 911, 1090, 1091, 1100, 1112, 1114, 1116, 1121, 1129
19..24, 64, 66, 76, 347, 350, 352, 358, 427, 444, 456, 486, 489, 491, 524, 552, 590, 648, 906, 910, 1114, 1116, 1121
20..24, 26, 64, 66, 69, 70, 72, 76, 83, 90, 91, 95, 101, 347, 350, 352, 354, 355, 357, 358, 361, 366, 421, 524, 528, 537, 540, 541, 550, 551, 554, 572, 574–576, 592, 593, 604, 605, 638, 648, 663, 857, 863, 872, 873, 875, 906, 913, 1091, 1100, 1103–1105, 1112, 1116, 1129
21..24, 26, 64, 66, 72, 76, 87, 90, 97, 101, 280, 281, 347, 350, 352, 358, 359, 361, 366, 369, 413, 451, 525, 528, 537, 538, 541, 546, 547, 550, 554, 573, 577, 592, 593, 596, 601, 603, 605, 684, 691, 696, 697, 863, 875, 906, 915, 1089, 1100, 1105, 1112, 1116, 1122
22..30, 31 34, 64, 66, 69, 72, 76, 87, 90, 91, 95, 97, 101, 320, 338, 339, 347, 350–352, 356, 358, 359, 361, 366, 381, 383, 399, 442, 456, 462, 523–525, 528, 533, 534, 537, 538, 541, 550, 554, 572, 573, 579, 584, 587, 592, 593, 599, 604, 605, 684, 688, 693, 697, 856, 857, 870, 872, 874, 875, 916, 917, 1100, 1102, 1103, 1105, 1112, 1116, 1122, 1129, 1140, 1141
23..24, 64, 66, 71, 76, 87, 90, 91, 347, 349, 350, 352, 358, 359, 366, 442, 525, 528, 541, 554, 571, 592, 605, 684, 882, 916, 917, 920, 1116, 1122
24..24, 26, 50, 51, 64, 66, 69, 72, 76, 90, 91, 101, 347, 350, 352, 355, 358, 359, 361, 366, 414, 444, 446, 456, 517, 525, 528, 529, 535, 537, 538, 541, 546, 547, 549, 550, 554, 577, 579, 584, 589, 592, 593, 604, 605, 648, 663, 664, 684, 692, 863, 870, 916, 917, 921, 1091, 1092, 1100, 1101, 1105, 1106, 1112, 1114, 1116, 1122, 1129
Mill 25..11, 24, 26, 47, 64, 66, 69, 70, 72, 73, 76, 87, 90, 91, 97, 98, 101, 321, 347, 350, 352, 358, 359, 366, 442, 444, 451, 456, 460, 517, 525, 528, 529, 537–539, 541, 546, 547, 549, 550, 556, 571, 577, 587, 592, 593, 596, 599, 605, 607, 608, 682, 857, 863, 869, 870, 872, 874, 875, 916, 924, 1086, 1088, 1091, 1096, 1100, 1103, 1105, 1106, 1108, 1112, 1114, 1116, 1119, 1130
26..30, 31, 35, 42, 46–48, 50, 64, 66, 68, 69, 72, 76, 87, 90, 96, 97, 101, 272, 273, 347, 350, 352, 357–359, 361, 366, 392, 393, 456, 460, 525, 528, 537, 540, 541, 546, 550, 556, 572, 574, 592, 593, 596, 604, 605, 648, 655, 663, 664, 843, 856, 861, 863, 872, 925, 926, 1091, 1100, 1103–1106, 1112, 1116
27..24, 26, 64, 66, 69, 72, 76, 90, 94, 101, 156, 158, 164, 166, 167, 170, 177, 178, 180, 182, 185–187, 189–192, 195–199, 201, 205, 207–209, 212, 214, 219, 280, 281, 347, 350, 352, 355, 356, 358, 366, 368, 432, 444, 451, 456, 480, 486, 489, 491, 525, 528, 533, 535–538, 541, 546, 550, 556, 585, 587, 592, 593, 604–606, 638, 648, 684, 692, 768, 856, 863, 864, 872, 874, 875, 879, 880, 883, 925, 928, 1090, 1091, 1096, 1100, 1105, 1107, 1112, 1113, 1116, 1119, 1171
28..10, 24, 26, 30, 31, 64, 67, 69, 72, 76, 90, 91, 97, 101, 104, 280, 281, 339, 340, 345, 347, 350, 353, 358, 359, 366, 381, 383, 388, 425, 432, 442, 444, 456, 461, 462, 525, 528, 535–538, 541, 546, 549, 550, 556, 574, 583, 585, 586, 592, 593, 596, 599, 604–606, 638, 684, 692, 694, 856, 864, 871, 875, 925, 933, 1004, 1091, 1100, 1103–1105, 1116, 1141
29..24, 26, 64, 76, 87, 90, 347, 350, 353, 359, 366, 525, 541, 556, 592, 593, 598, 602, 605, 684, 863, 880, 925, 926, 935, 1089, 1100, 1105, 1116, 1122
30..10, 24, 26, 46, 64, 66, 67, 69, 72, 76, 87, 90, 91, 97, 98, 101, 339, 347, 350, 353, 358, 359, 366, 382, 383, 419, 444, 446, 449, 456, 463, 481, 486, 489, 491, 522, 523, 525, 527, 528, 530, 532, 533, 537–539, 541, 546, 547, 549, 550, 556, 572, 573, 577, 579–581, 586, 587, 592, 593, 604, 605, 638, 648, 658, 661, 684, 688, 692, 693, 695, 696, 855, 861, 863, 872, 875, 936, 937, 1089, 1100, 1105, 1109, 1112, 1113, 1116, 1141, 1164
31..24, 26, 63, 64, 67, 69, 72, 76, 87, 90, 91, 97, 101, 104, 347, 350, 353, 358, 362, 366, 442, 444, 456, 481, 489, 491, 525, 528, 534, 535, 537, 542, 550, 558, 572, 577, 582, 587, 592, 593, 596, 604, 605, 648, 684, 692, 697, 857, 863, 872, 875, 936, 940, 1091, 1100, 1105, 1116
32..24, 26, 64, 67, 69, 76, 87, 90, 91, 97, 101, 102, 339, 347, 351, 353, 354, 359, 366, 393, 444, 525, 528, 542, 550, 558, 572, 587, 592, 593, 604, 605, 648, 684, 697, 856, 857, 863, 875, 936, 942, 1100, 1101, 1105, 1112, 1116, 1119
33..24, 26, 67, 76, 91, 347, 351, 353, 359, 366, 396, 442, 525, 542, 558, 572, 584, 592, 593, 605, 684, 697, 857, 936, 945, 1116
34..46, 64, 67, 76, 87, 339, 347, 353, 359, 366, 367, 449, 456, 486, 525, 542, 545, 558, 587, 592, 593, 604, 605, 648, 684, 856, 863, 875, 936, 946, 1089, 1100, 1105, 1112, 1116
35..46, 64, 66, 67, 69, 72, 76, 87, 90, 91, 97, 101, 337, 339, 347, 350, 351, 353, 358, 359, 361, 366, 393, 444, 458, 515, 525, 542, 546, 547, 550, 551, 558, 572, 587, 592–594, 604, 605, 648, 661–663, 684, 692, 694, 697, 856, 857, 863, 936, 947, 1089, 1100, 1105, 1116, 1122
36..24, 64, 76, 347, 351, 353, 366, 396, 442, 525, 526, 542, 558, 572, 592, 605, 648, 684, 692, 936, 951, 1110, 1116
37..24, 64, 67, 76, 347, 351, 353, 358, 366, 398, 486, 507, 522–524, 526, 528, 530, 531, 533, 534, 537, 538, 550, 580, 592, 648, 684, 687, 692, 694, 697, 842, 856, 863, 936, 954, 1089, 1091, 1116
38..24, 26, 64, 67, 76, 91, 121, 126, 134, 280, 281, 339, 347, 351, 353, 354, 358, 359, 366, 382, 383, 393, 395, 444, 456, 458, 463, 517, 524, 526, 529, 542, 546, 547, 550, 558, 572, 575, 579, 587, 592, 593, 605, 638, 648, 661, 662, 684, 693, 696, 697, 843, 848, 857, 863, 872, 875, 879, 973, 974, 1085, 1087, 1089, 1095, 1098, 1102, 1105–1108, 1112, 1116, 1141
39..24, 26, 64, 67, 69, 76, 91, 280, 281, 347, 351, 353, 358, 359, 366, 396, 403, 404, 415, 416, 444, 526, 527, 535, 537, 542, 545, 550, 562, 572, 575, 582, 592, 593, 602, 605, 607, 638, 648, 661, 662, 857, 863, 875, 973, 976, 1091, 1103–1105, 1112, 1116

Mill 40..10, 24, 26, 48, 64, 67–69, 72, 76, 87, 90, 91, 101, 313, 339, 347, 251, 353, 356, 361, 366, 373, 395, 403, 404, 416, 444, 446, 456, 482, 483, 485, 526, 528, 543, 546, 547, 550, 562, 579, 587, 592, 593, 604, 605, 607, 638, 647, 648, 656, 663, 863, 872, 875, 879, 973, 978, 1086, 1089, 1091, 1099, 1100, 1103–1107, 1112–1114, 1116

41..24, 26, 48, 64, 87, 347, 351, 353, 358, 366, 396, 424, 444, 451, 456, 482, 526, 543, 546, 550, 562, 572, 592, 593, 605, 647, 648, 650, 661, 663, 973, 982, 1103, 1105, 1112, 1116, 1121

42..64, 67, 72, 76, 91, 97, 101, 118, 120–123, 126–128 134, 258, 339, 340, 345, 347, 351, 353, 366, 396, 403, 404, 444, 456, 458, 481, 486, 491, 515, 519, 526, 528, 529, 543, 551, 564, 572, 587, 592, 605, 638, 684, 696, 697, 863, 875, 984, 1085, 1098, 1102, 1105, 1112, 1116, 1121, 1130

43..64, 67, 69, 72, 76, 91, 101, 118, 120–123, 126–128, 133, 134, 339, 347, 351, 353, 358, 366, 396, 403, 404, 444, 451, 456, 517, 526, 543, 546, 547, 551, 564, 572, 587, 592, 593, 596, 604, 605, 648, 684, 689, 692, 695–697, 843, 861, 863, 872, 875, 984, 987, 1091, 1100, 1112, 1113, 1115, 1116, 1121

44..18, 24, 27, 54, 118, 120–123, 126–129, 131, 133–135, 257, 259, 280, 337, 339, 392, 393, 404, 449, 481, 485, 486, 489, 491, 515, 522, 526, 529, 537, 543, 564, 571, 577, 580, 582, 583, 586–589, 592–594, 596, 601, 605, 638, 681, 684, 688, 694, 695, 697, 843, 857, 861, 865, 866, 870–872, 874–876, 990, 995, 1000, 1091, 1092, 1095, 1103, 1105, 1108, 1109, 1112, 1113, 1116, 1120, 1149, 1191

45..121–123, 126, 128, 133–135, 320, 390, 391, 448, 515, 526, 529, 537, 586, 587, 589, 592, 684, 696, 805, 870, 990, 993, 1091, 1103, 1105, 1110, 1116, 1130

46..12, 24, 27, 118, 120–123, 126–128, 131, 133–135, 320, 337–339, 390, 391, 396–398, 403, 449, 456, 480–482, 485, 486, 489, 491, 515, 526, 537, 543, 544, 547, 566, 571, 577, 583, 586, 587, 592–594, 605, 684, 689, 696, 697, 726, 727, 843, 870, 872, 875, 990, 994, 1088, 1091, 1103, 1105, 1110, 1116, 1131

47..12, 24, 27, 118, 121–123, 126–128, 133–135, 280, 332, 337–339, 397, 403, 449, 456, 480, 482, 485, 486, 489, 491, 515, 522, 526, 529, 537, 544, 566, 571, 572, 586, 587, 589, 592–594, 605, 684, 697, 707, 726, 727, 843, 857, 870, 872, 875, 990, 998, 1091, 1103, 1105, 1110, 1116, 1120, 1131

48..10, 12, 24, 27, 118, 120–123, 126–131, 133–135, 320, 337–339, 397, 398, 400, 404, 449, 456, 480–482, 485, 486, 489, 491, 515, 522, 526, 529, 537, 538, 544, 547, 550, 568, 571, 572, 577, 586–588, 592–594, 596, 599, 601, 605, 684, 689, 695–697, 843, 870, 872, 875, 990, 997, 1000, 1091, 1103, 1105, 1113, 1116, 1131

49 .....270, 676, 1004, 1116, 1172

50.....1004, 1005, 1073, 1116, 1126

51.....1006, 1007, 1009, 1116

52.....1006, 1008, 1009, 1011, 1013, 1116

53..30, 31, 167, 170, 199, 202, 205, 207, 208, 212, 219, 648, 655, 659, 663, 1014, 1089, 1091, 1100, 1103, 1105, 1116

54..27, 46, 170, 199, 205, 207, 208, 212, 219, 339, 482, 648, 663, 1014, 1015, 1110, 1116, 1131

55..24, 145, 148, 156, 158, 164–167, 170, 177, 178, 180, 182, 186, 187, 189–192, 196–199, 201, 202, 205, 207–209, 211, 212, 219, 222, 304, 482, 485, 491, 648, 665, 701, 768, 1014, 1016, 1030, 1091, 1100, 1101, 1110, 1116

56..145, 156, 158, 164, 165–167, 170, 174, 177, 178, 180, 182, 186, 187, 189–192, 196–199, 201, 202, 205–209, 212, 214, 219–222, 265, 724, 737, 740, 744, 745, 748, 756, 768, 770, 783, 785, 1017, 1089, 1093, 1103, 1105, 1116, 1119, 1131

57..24, 27, 145, 153, 156, 158, 166, 167, 169, 174, 177, 179–182, 186, 187, 189–192, 196–199, 201, 202, 204, 205, 207–209, 212, 214, 219, 222, 252, 265, 339, 340, 647, 648, 650, 655, 659, 661, 663, 664, 735, 737, 740, 742, 744, 745, 748, 756, 759, 765, 768, 772, 774, 783, 1018, 1089, 1092, 1100, 1105, 1116, 1131, 1191

58..145, 156, 158, 166, 167, 170, 172, 178, 180, 182, 186, 187, 189–192 195–199, 201, 202, 205, 207–209, 212, 214, 219, 222, 239, 252, 456, 648, 650, 655, 661, 663, 73[illegible] 744, 745, 748, 756, 772, 774, 1018, 101[illegible] 1089, 1100, 1103, 1105, 1116

59..24, 27, 145, 156, 1[illegible]8, 166, 167, 169, 174, 177–180, 182, 186, 187, 189–192, 196–199, 201, 202, 205–209, 212, 214, 219, 222, 339, 340, 482, 647, 648, 655, 659, 663, 664, 737, 744, 745, 748, 756, 759, 765, 772, 785, 1018, 1020, 1088, 1089, 1100, 1103, 1104, 1109, 1116, 1132

Mill 60..38, 46, 145, 156, 167, 169, 180, 182, 189, 199, 201, 205, 207, 208, 212, 214, 219, 222, 648, 650, 661, 737, 740, 742, 744, 748, 1018, 1021, 1089, 1105

61..38, 46, 145, 156, 158, 164–167, 169, 174, 175, 177, 179, 180, 182, 185–187, 189–192, 196–199, 201, 202, 205, 207–209, 212–214, 219, 222, 266, 338–340, 648, 659, 661, 663, 664, 737, 740, 746, 748, 756, 765, 768, 783, 785, 848, 858, 860, 861, 875, 1018, 1021, 1030, 1089, 1090, 1100, 1103, 1105, 1116, 1132

62..24, 27, 48, 145, 155, 156, 158, 165–167, 169, 177–182, 185–187, 189–192, 197–199, 201, 202, 205, 207–209, 212, 214, 219, 222, 265, 339, 340, 648, 659, 661, 703, 733, 737, 741, 742, 748, 750, 756, 757, 765, 768, 772, 783, 1018, 1022, 1089, 1100, 1103, 1105, 1116

63..24, 167, 170, 177, 178, 182, 190, 191, 199, 201, 205, 207, 208, 212, 214, 219, 648, 737, 756, 772, 1018, 1023, 1089, 1116

64..24, 27, 48, 145, 153, 155, 156, 158, 164–167, 169, 174, 176, 177–180, 182, 185–192, 196–199, 201, 202, 205–209, 212–214, 219 222, 339, 340, 648, 659, 663, 733, 737, 740, 742, 745, 756, 768, 772, 773, 864, 1018, 1023, 1089, 1100, 1103, 1105, 1116, 1132

65..24, 156, 158, 166, 169, 174, 177, 178, 180–182, 185, 187, 189–191, 196–199, 201, 202, 207–209, 212, 214, 219, 222, 238, 265, 338, 339, 482, 491, 647, 648, 659, 661, 733, 735, 737, 738, 740, 741, 743, 744, 746–748, 750, 754, 756, 772, 773, 783, 1018, 1024, 1039, 1089, 1092, 1103, 1104, 1116, 1132, 1168

66..46, 47, 156, 166, 167, 169, 177, 180–182, 186, 187, 189–192, 197–200, 202, 205, 207, 212, 214, 219, 222, 252, 682, 735, 738, 741, 744, 745, 747, 753, 756, 760, 768, 773, 775, 781, 785, 1018, 1025, 1088, 1091, 1098, 1100, 1102, 1105, 1116, 1132, 1133

67..28, 145, 152, 153, 156, 158, 166, 167, 169, 174, 175, 177–182, 184–187, 189–192, 194–199, 201, 202, 204, 205, 207–210, 212, 214, 219, 222, 482, 733, 735, 738, 740–742, 744, 746, 747, 752, 756, 759, 765, 768, 771, 773–775, 783, 785, 872, 1018, 1026, 1030, 1091, 1100, 1103, 1105, 1106, 1116, 1133

68..24, 27, 145, 156, 158, 164, 166, 167, 170, 174, 177, 178, 180, 182, 185–187, 189–192, 196–199, 201, 202, 205–209, 212, 214, 219, 222, 252, 303, 339, 340, 482, 648, 659, 661, 664, 733, 735, 738, 741, 744–746, 748, 755, 756, 783, 785, 1018, 1027, 1028, 1040, 1091, 1100, 1103, 1104, 1111, 1114, 1116, 1133, 1134

69..158, 173, 175, 184, 212, 214, 648, 735, 745, 762, 783, 785, 1018, 1028–1030, 1089, 1091, 1100, 1105, 1116, 1133

70..167, 169, 178, 179, 182, 199, 202, 205, 207, 208, 219, 586, 682, 738, 742, 744, 773, 1018, 1029, 1047, 1089, 1116

71..145, 156, 167, 170, 174, 177, 178, 182, 187, 189–191, 196–199, 201, 205, 207–209, 212, 214, 219, 222, 265, 418, 648, 660–662, 665–667, 738, 740, 743–745, 748, 772, 773, 780, 1029–1031, 1037, 1089, 1092, 1116

72..24, 156, 158, 166, 167, 169, 174, 178, 179, 182, 187, 189, 191, 192, 196–199, 201, 202, 205–209, 212, 214, 219, 222, 265, 320, 339, 448, 456, 648, 661, 676, 683, 738, 741, 743, 744, 747, 756, 772, 773, 777, 783, 856, 1030, 1032, 1037, 1038, 1089, 1100, 1116, 1133

73..24, 145, 156, 158, 166, 167, 169, 173, 174, 176–182, 184–187, 189–192, 196–203, 205, 207–209, 212, 214, 219, 222, 238, 265, 338, 339, 456, 482, 485, 491, 647, 648, 659, 733, 735, 738, 740, 741, 743, 744, 746–748, 750, 754, 756–758, 765, 772, 773, 775, 781, 783, 1024, 1030, 1033, 1034, 1038, 1089, 1092, 1100, 1101, 1103, 1116, 1132, 1168

74..24, 145, 156, 158, 166, 167, 169, 174, 177–182, 185, 187, 189–191, 196–199, 201, 202, 205, 207–209, 212, 214, 219, 222, 238, 265, 338, 339, 482, 485, 491, 647, 648, 650, 652, 659, 661, 733, 735, 738–741, 743, 744, 746–748, 750, 754, 756, 783, 1024, 1030, 1034, 1038, 1089, 1092, 1100, 1101, 1103, 1117, 1132, 1168

75..145, 156, 158, 166, 167, 170, 178, 182, 186, 187, 189–192, 196–199, 201, 202, 205, 208, 209, 211, 212, 214, 219, 222, 339, 648, 659, 663, 664, 700, 701, 703, 738, 744, 756, 772, 870, 1030, 1034, 1089, 1090, 1103, 1105, 1117

Mill 76..145, 156, 158, 166, 167, 169, 177, 179, 180, 182, 186, 187, 189, 190–192, 196, 198, 199, 201, 202, 205, 207–209, 212, 214, 219, 265, 648, 664, 703, 738, 740, 743, 750, 765, 772, 879, 1030, 1035, 1089, 1105, 1117
77..10, 145, 148, 156, 158, 164, 166, 167, 169, 174, 177–182, 185–187, 189–192, 195–199, 201, 202, 204–209, 211, 212, 214, 219, 220, 222, 342, 482, 680–682, 703, 739, 741, 747, 753, 756, 757, 761–763, 765, 766, 768, 774, 842, 1030, 1035, 1046, 1047, 1089, 1091, 1100, 1105, 1117, 1133
78..418, 444, 446, 648, 653, 655, 658, 660, 661, 665–667, 700, 702, 703, 857, 874, 1017, 1029–1031, 1035, 1037, 1038, 1089, 1090, 1100, 1101, 1117, 1126
79..456, 648, 655, 658, 700, 701, 703, 723, 875, 1030, 1032, 1033, 1037, 1038, 1100, 1117
80..456, 700–703, 875, 1029, 1030, 1033, 1038, 1039, 1100, 1101, 1117
81.....238, 1030, 1038, 1039, 1089, 1100, 1117
82..24, 27, 145, 156, 158, 164, 166, 167, 170, 174, 178, 180, 182, 185–187, 189–192, 196–199, 201, 202, 205–209, 212, 214, 219, 222, 244, 248–250, 252, 339, 456, 458, 480, 486, 491, 648, 659, 661, 663, 664, 723, 733, 735, 739, 748, 755, 756, 760, 761, 763, 765, 766, 768, 777, 780, 785, 863, 1027, 1028, 1039, 1040, 1091, 1100, 1101, 1103, 1104, 1111, 1114, 1117, 1134
83..46, 47, 145, 156, 167, 170, 174, 178, 183, 185–187, 189–192, 196, 197, 199, 201, 202, 205–208, 212, 214, 219, 244, 246, 248, 249, 252, 456, 458, 460, 482, 648, 663, 777, 778, 780, 783, 1039–1041, 1091, 1095, 1100, 1101, 1103–1106, 1110, 1117
84..24, 27, 42, 46, 145, 156, 158, 166, 167, 170, 174, 177, 178, 180, 181, 183, 185–187, 189–192, 196–199, 201, 202, 205–209, 212, 214, 219, 222, 244, 246, 248, 249, 252, 339, 347, 351, 353, 354, 356, 359, 366, 456, 458, 460, 648, 663, 739, 742, 743, 748, 756, 768, 772, 777, 780, 783, 785, 860, 861, 875, 1039, 1040, 1045, 1085, 1089, 1091, 1095, 1100, 1101, 1103–1106, 1109, 1110, 1117, 1134
85..24, 65, 67, 76, 167, 169, 178, 179, 199, 202, 205, 207, 208, 219, 220, 351, 353, 411, 442, 451, 526, 528, 568, 586, 592, 682, 739, 742, 773, 1029, 1046, 1047, 1089, 1117
86..24, 27, 65, 67, 72, 76, 87, 90, 101, 168, 169, 174, 280, 281, 342, 347, 351, 353, 354, 366, 410, 419, 526, 528, 544, 545, 550, 568, 572, 587, 588, 592, 593, 604, 605, 648, 682, 684, 696–698, 703, 735, 737, 739, 748, 756, 774, 785, 848, 857, 863, 872, 879, 883, 1046–1048, 1091, 1100, 1105, 1117, 1122
87..24, 27, 49, 65, 67, 72, 76, 87, 90, 101, 145, 156, 158, 166, 167, 170, 178, 180, 183, 185–187, 189, 191, 192, 196, 199, 202, 205, 207–209, 212, 219, 347, 351, 353, 358, 359, 413, 427, 450, 451, 526, 528, 537, 544, 568, 586, 592, 593, 648, 739, 742, 768, 848, 856, 863, 872, 1046, 1050, 1089, 1092, 1112, 1117
88..24, 27, 65, 67, 76, 87, 90, 101, 145, 156, 158, 166, 167, 169, 178, 180, 183, 189, 191, 192, 197–199, 201, 205, 207, 208, 212, 214, 219, 347, 351, 353, 358, 359, 414, 450, 451, 526–528, 537, 544, 550, 568, 592, 593, 605, 648, 682, 739, 742, 773, 872, 1030, 1046, 1052, 1089, 1105, 1112, 1117
89..21, 24, 27, 45, 46, 65, 67, 77, 87, 90, 91, 101, 347, 351, 353, 362, 366, 790, 798, 863, 880, 883, 1053, 1055, 1117
90..23, 24, 27, 30, 31, 65, 67, 77, 87, 90, 101, 302, 347, 351, 353, 803, 861, 863, 1053, 1055, 1091, 1100, 1117
91..65, 101, 106, 107, 310, 340, 790, 810, 813, 816, 843, 856, 858, 861, 863, 864, 881, 882, 883, 1053, 1054, 1056, 1091–1094, 1096, 1098, 1100, 1108, 1112, 1114, 1117, 1135
92..24, 27, 65, 67, 77, 90, 101, 304, 338, 339, 341, 347, 351, 353, 366, 451, 486, 489, 491, 522, 527, 528, 544, 550, 570, 592, 593, 605, 790, 805, 807, 814, 843, 860, 862–864, 880, 882, 883, 891, 1060, 1063, 1088, 1091, 1094, 1112, 1113, 1117, 1135
93..24, 27, 65, 67, 69, 87, 90, 347, 351, 353, 354, 366, 790, 800, 814, 895, 1060, 1065, 1117
94..96, 103, 104, 309, 346, 848, 856, 861, 880, 882, 883, 1070, 1091, 1094, 1096, 1190
95 ..... 1616, 1934
96 .....1481, 1617, 1934, 1940
97 .....1620, 1934
98 .....1620, 1621, 1932, 1934
99 .....1620, 1622, 1934

Mill 100 .....1275, 1570, 1614, 1623, 1934
101 .....1489, 1623, 1626, 1934
102 .....1623, 1629, 1934
103 .....1291, 1292, 1517, 1631, 1934
104 .....1634, 1934
105 .....1634, 1635, 1934
106 .....1371, 1406, 1416, 1516, 1634, 1639, 1934
107 .....1634, 1645, 1934
108 .....1634, 1646, 1931, 1934
109 .....1634, 1648, 1934
110 .....1634, 1651, 1934
111 .....1652, 1654, 1934
112 .....1652, 1657, 1934
113 .....1581, 1652, 1659, 1934
114 .....1541, 1652, 1660, 1934
115 .....1652, 1665, 1934
116 .....1665, 1934
117 .....1665, 1666, 1934
118 .....1286, 1291, 1294, 1676, 1934
119 .....1679, 1934
120 .....1361, 1452, 1614, 1620, 1934
121 .....1361, 1680, 1685, 1934
122 .....1680, 1687, 1934
123 .....1361, 1680, 1688, 1934
124 .....1361, 1680, 1690, 1935
125 .....1356, 1361, 1680, 1700, 1932, 1935
126 .....1361, 1532, 1706, 1932, 1935
127 .....1361, 1458, 1487, 1706, 1709, 1932, 1935
128 .....1713, 1932, 1935
129 .....1561, 1713, 1715, 1935
130 .....1560, 1713, 1719, 1935
131 .....1361, 1551, 1590, 1713, 1724, 1935
132 .....1361, 1404, 1406, 1713, 1726, 1932, 1935
133 .....1713, 1731, 1935, 1940
134 .....1713, 1732, 1935
135 .....1536, 1713, 1735, 1935
136 .....1361, 1713, 1737, 1935
137 .....1300, 1347, 1438, 1458, 1548, 1713, 1739, 1935
138 .....1535, 1713, 1742, 1935
139 .....1244, 1365, 1535, 1748, 1932, 1935
140 .....1546, 1548, 1551, 1748, 1758, 1935
141 .....1345, 1361, 1525, 1591, 1748, 1759, 1935
142 .....1361, 1748, 1766, 1935
143 .....1768, 1935
144 ....1361, 1365, 1590, 1592, 1768, 1771, 1932, 1935
145 .....1780, 1935
146 ..... 1783, 1936
147 .....1783, 1786, 1936
148 .....1361, 1783, 1792, 1936
149 .....1564, 1794, 1936
150 .....1794, 1795, 1936
151 .....1794, 1802, 1936
152 .....1345, 1361, 1585, 1804, 1931, 1936
153 .....1814, 1936
154 .....1341, 1815, 1932, 1936
155 .....1368, 1369, 1815, 1816, 1932, 1936
156 .....1361, 1530, 1531, 1815, 1817, 1936
157 .....1815, 1818, 1936
158 .....1361, 1527, 1585, 1815, 1820, 1936
159 ..... 1361, 1828, 1936
160 .....1831, 1936
161 .....1361, 1836, 1932, 1936
162 ..1328, 1329, 1361, 1391, 1449, 1493, 1615, 1836, 1841, 1932, 1936
163 .....1836, 1848, 1936
164 ....1346, 1361, 1532, 1607, 1836, 1849, 1936
165 .....1264, 1836, 1850, 1936
166 .....1361, 1836, 1932, 1936
167 .....1305, 1502, 1503, 1585, 1836, 1932, 1936
168 .....1836, 1860, 1937
169 .....1361, 1836, 1864, 1932, 1937
170 .....1361, 1836, 1865, 1937
171 .....1361, 1836, 1868, 1931, 1937
172 .....1317, 1361, 1836, 1871, 1931, 1932, 1937
173 ...1408, 1413, 1585, 1595, 1836, 1875, 1927, 1928, 1929, 1930, 1931, 1937, 1940
174 .....1361, 1478, 1585, 1836, 1882, 1932, 1937
175 .....1888, 1937
176 .....1361, 1891, 1937
177 .....1256, 1448, 1587, 1891, 1931, 1937
178 .....1256, 1489, 1891, 1895, 1937
179 .....1256, 1361, 1891, 1897, 1937
180 .....1256, 1891, 1901, 1937
181 .....1250, 1254, 1256, 1361, 1891, 1906, 1937
182 .....1254, 1256, 1891, 1908, 1931, 1937
183 .....1458, 1913, 1937
184 .....1913, 1914, 1937
185 ..... 1915, 1937
186 ..... 1916, 1937
187 ..... 1919, 1937

Mill 188 ..... 1921, 1937
arrastra 1039
at Monteponi, Sardinia 1066
buildings, construction of 1088
Clausthal 965
constants for the engineer, importance of. F. T. Snyder 2048
construction. See under Construction.
saving of mill height at Mill 158 1826
data on spindle breakers 46
distributors 857
for asbestos 1079
clay and kaolin 1075
Elmore oil process 1072
graphite 1074
mercury ores 1074
tin ores 1081
heating of 1098
Himmelfahrt 958
Iron Mountain 897
Joseph Wharton 1058
Laurenburg 961
Mons phosphate 899
Monteponi 1066
numbers, key to xxv
plant 1087
practice in California, gold. E. B. Preston 1278
processes and management 888
sampling at Mill 182 1912
screens 1365
sites 1085
Sulphur Mines & Railroad Co. 905
testing 1168
sieve for 1996, 1997
tests 1164
treatment, schemes of 1613
Vieille Montagne Co. 911
with stamps and canvas tables 1038
Witherbee Sherman 1059
work 381
compared with small tests 1168
Miller pump 927
Robert, Hick revolving grizzly 385
Millerite, specific gravity of 1189
Milligram, equivalents of 1187
Millimeter, equivalents of 1187
Milling. See under Ore Dressing and Concentration.
accounts 1122
at Gundling No. 5. Joplin Missouri. D. Brittain 2046
costs of at mills 1126, 1639, 1640, 1643, 1793
expenses 1123
experiences. R. D. O. Johnson 2048
improvements in 1904 in 2047
in Western Chihuahua 1664
losses 1945
of chromite 1073
plants for small mines. F. L. Bartlett 2036
practice in the Witwatersrand, South Africa 1643
Mills, arrangement of 1086, 1107
bibliography for 1173
California *versus* Colorado 1030
canvas plants 1029
care of 1114
choice of 1161
complex jigging, at Lake Superior 990
in Colorado and Utah 925
Idaho and Europe 937
Montana 973
southeastern Missouri 916
construction of 1088
costs of erecting 1124
divisions of for different ores 1111
for corundum and emery 1078
gold combination 1046
key to numbers xxv
location, capacity, etc. xxv
of 1085
magnetic combination 1060
method of studying 1613
Mining and Reduction Company 1792
name, location, minerals and capacity xxv
order of 1616
outlines of 889
principles in 889
pulverizing 232
saving copper and sulphur values 1616, 1888
gold and copper values 1616, 1831
silver and copper values 1616, 1836
lead and copper values 1616, 1786
zinc values 1616, 1748
Mills saving iron and copper values 1616, 1828
manganese values 1616, 1814
lead and zinc values 1616, 1780
zinc and copper 1616, 1794
iron values 1616, 1783
only asbestos 1616, 1916
copper values 1616, 1891
diamonds 1616, 1921
iron values 1616, 1815
lead values 1616, 1706
mercury values 1616, 1919
pyrite 1616, 1913
silver values 1616, 1679
silver and lead values 1616, 1680
lead, and zinc values 1616, 1713
tin and tungsten values 1616, 1915
zinc and manganese values 1616, 1804
sectional 1108
sieve scales in American, table of 1361
silver 1039
combination 1039
simple jigging 900
using hand jigs 892
stamp 1013
with plates and vanners 1018
no vanners 1017
without amalgamated plates 1014
steam stamp in Montana 984
using fine crushing and riffle tables 1004
hydraulicking or dredging 1006
magnetism 1053
with jigs, vanners and tables 1103
log washers 895
Millstones, discussion of 2033
Milwaukee Mining Co., mill 940
Mimetite, specific gravity of 1189
Minas Geraes, Brazil, strakes at 725
Tecolotes y Anexas mill. G. A. Burr 2037
Mine 1 482
12 ..... 481, 482
24 ..... 481, 482
25 482
26 ..... 481, 482
30 ..... 481, 482
31 ..... 481, 482
35 ..... 481, 482
38 481
39 482
42 481
44 12
46 ..... 12, 843
47 12
54 481
57 482
59 482
67 482
77 482
83 481
87 ..... 481, 482
93 481
and Smelter Supply Company, cone classifiers at Mill 141 1761
blasting in 9
fines, treatment of 1111
La Motte mill ..... xxvi, 921
picking in 481
water used 1105
Mineral Resources of the United States, pan amalgamation 1520
aggregate 1163
examination 1162
oils 1097
Minerals, adhesion of 4
aggregation of 3
changed by heat 4
color and luster of 3
decrepitation of 5
effect of greasiness of 4
magnetism of 4
momentum of 4
settling power 4
specific gravity of 3
floated by flotation processes, list of 1555
Flotation Company, flotation processes 1560
hardness of 2
list of good and poor conductors for electrostatic separation 1550
magnetism of 790
separated in mills. See Individual Mills in Chapter XX.
Separation Company, flotation process 1555

Minerals Separation process at Mill 130 .. 1560, 1719, 1721, 1723
specific gravities of ... 1188
structure and fracture of ... 3
tenacity and brittleness ... 2
which become magnetic on roasting ... 1995
Miners' inch measure for water ... 1197
ton ... 883
Mines de Pierrefitte ... 1780
Mineville, New York, mill at ... 1059
Minimum difference in specific gravity for jigging .. 609
Mining, cost of ... 1126
costs, statement of ... 1947
wire cloth screens, sizes of ... 1196
Minnesota iron mine, Blake breaker at ... 23
cost of crushing at ... 60
crushing at ... 57
Iron Co., cost of breaking ore ... 51
Silver Company, Ltd. ... 1731
Minnie & A. Y. mill ... xxv, 909
Minor processes of separation. ... 839
Miscellaneous apparatus ... 882
machines using agitation ... 682
plates ... 741
processes of separation ... 790
Missouri, capacity of jigs in ... 602
concentration in southwest. R. B. Brinsmade . 2401
cost of mill in ... 1126
milling in ... 1129
producing lead and zinc in ... 1968, 1969, 1970, 1971, 1972, 1973, 1974
drop between jig sieves ... 550
hand jigging in ... 893
jigs in ... 495
jig plunger clearance in ... 530
jigs in ... 507, 522, 642, 643
-Kansas district, milling in the. O. Ruhl ... 2045
concentration in the. H. A. Titcombe ... 2036
lead and zinc mills, methods of jigging in ... 571
mills in ... 916
zinc ore, sizing test on ... 303
limestone, jaw plates used in crushing ... 48
mills in .. 900, 1120, 1179, 1180, 1181, 1182, 1183, 1185
milling in O. M. Bilharz ... 2034
southwest. O. Ruhl ... 2043
number of sieves on jigs in ... 590
Robinson jig in ... 504
typical milling practice in Joplin. C. L. Watson ... 2042
R. L. Herrick ... 2042
Zinc and Lead Company mill ... 2036
jigs in ... 609
mills, general scheme of. R. H. Richards .. 2040
ores, improvements in milling. W. E. Ford .. 2039
Mixed sizes, tests on jigging ... 630
Mixer. Blaisdell mechanical mixer ... 1603
for oil separation ... 831
Mixing box at Mill 162 ... 1843
pans at Mill 188 ... 1921
vats at Mill 130 ... 1722
Moctezuma Copper Company ... 1831
Modern practice in California gold mills ... 1619
Modifications of Collom jig ... 515
Evans jig ... 517
Frue vanner ... 651
Moisture in concentrates ... 880
drained ore ... 1106
removed in driers ... 881
samples ... 846, 1575
Molasses spigot for jigs ... 528
Molybdenite, concentration of. J. Ohly ... 2029
dressing ... 1567
separated by oil ... 831
specific gravity of ... 1189
Molybdenum ... 1569
atomic weight of ... 1188
Momentum and trajectory ... 1611
of minerals ... 4
use made of, in mills ... 889
used in dry separation ... 819
Monadnock Chili mills at mills ... 1775, 1850
Monarch breaker, cost of crushing by ... 51
of Blake type ... 20
table of sizes of ... 21
magnetic separator ... 797
Monazite dressing in the Carolinas ... 2030
sands, concentration of. F. Katzer ... 2030
sand washing in the Carolinas ... 2028
C. R. Bohm ... 2027
separated by magnets ... 790
Monitor and Ajax fraction ... 1732
hydraulic giant ... 333
mill ... 1732
Mons, Belgium, phosphate dressing at ... 1179
plant for phosphate ... 895
Montana & Denver Reduction Company mill. F. D. Smith ... 2036
Coal and Coke Company, coal washing at the. J. V. Schaefer ... 2051
copper mills in ... 973
sulphide mills ... 1103
cost of mill in ... 1126
milling in ... 1134
district, cost of producing copper in .. 1950, 1951, 1952, 1953
dredging in ... 1009
Iron Works, rolls ... 76
mills in ... 1136, 1181, 1182
Mining Co., Limited, mill ... xxviii, 1027, 1040, 1181
sapphire washing ... 1081
Tonapah mill. F. L. Bosqui ... 2038
Zinc Company. Blake-Morscher separator at ... 1551
Monte Cristo mill, Huntington mill at ... 281
Monteponi, calamine plant at. E. Ferraris ... 2040
cost of mill at ... 1126
Ferraris belt table at ... 698
classifier at ... 400
drum-type magnetic separator at ... 1529
jig at ... 584
magnetic separator at ... 1525
screen at ... 343
jig discharge at ... 579
jigs at ... 523, 597, 642, 643
removal of tailings ... 587
magnetic mill at ... 1060, 1117
separation at ... 834, 836
separator at ... 799, 810
roasting for magnetism at ... 815
Sardinia, costs at ... 1136
mill at ... 1066, 1179, 1181, 1185
stay boxes used at ... 588
zinc mill at ... 1117
Montezuma Lead Company mill. G. A. Burr ... 2037
Moonta, Australia, concentration at ... 2033
mines, Hancock jig at ... 505
Moore filter-press system at Mill 103 ... 1633
Moravia, graphite dressing in ... 1183
mill in ... 1075
Morel & Hall's mill, bibliography for ... 295
ball mill ... 234
Morenci, Arizona, type of settling tank used at ... 1413
Morey & Sperry pulverizer ... 234
bibliography for ... 295
Morgan, P. G., gold dredging in New Zealand ... 1181
Morison, D. B. ... 215, 229
efficiency of stamps ... 219
limits of drop in stamps ... 216
Morison's pneumatic stamp ... 143
stamp battery ... 229
Morison's curves of velocity of stamps ... 215
experiments on stamp efficiency ... 224
high-speed stamp ... 141, 2012
Morning mill, Mullan, Idaho .. xxvi, 946, 1179, 1687, 2042
stamp mortar ... 228
Star cement gravel mine ... 211
Morris centrifugal pump at Mill 139 ... 1756
at Mill 175 ... 1890
Theodore W. & Co., plate glass for launder linings ... 1595
Morro Velho mine, height of discharge of stamps ... 213
stamp mine, Brazil ... 2036
Morscher, Lawrence N., electrostatic separation ... 1550
Morse Bros. Machinery & Supply Company, the Wild mill ... 1304
F. B., corrugated vanner belt ... 647
Tustin mill ... 294
W. S., an Arizona gold stamp mill ... 1175
gravity stamps ... 224, 225
Mortar beds for steam stamps ... 114
of Nordberg steam stamps ... 1247
blocks for gravity stamps ... 145
marshy ground ... 148
of concrete ... 148
cast iron ... 148
box, Bremner's ... 2012
Morison open front ... 2011
covers ... 167
discharge at Mill 181 ... 1906
Mortar discharge for Leavitt stamp ... 993
for grinding amalgam ... 780

UNIVERSITY OF CALIFORNIA

Mortar hand, for testing 1137
housing for steam stamps 119, 120
jig discharge for steam stamps 1256
jigs at Mill 177 1892
linings 166
at Mill 117 1668
Mortars at Mill 117 1668
Boss individual mortars 1265
standard battery mortar 1267
Dahlonega 152
for gravity stamps 160, 161
gravity stamp 1263
Homestake type 1267
introducing water into 2011
Merrall's individual mortar 1264
Nordberg steam stamp 1003
Rapid Economy individual 1266
Schorr stay-overflow, the 1266
single and double discharge 167
standard ten-stamp battery 1267
steam stamps 119
table of dimensions of 165
weights of 164
Traylor double-discharge 1266
sectional mortars 1267
Mosler, C., Ball stamp 143
Collom jig 643
copper dressing at Lake Supperior 1186
Phœnix pneumatic stamp 143
stamps in Quincy mill 230
Mosser, W. F. & Co., rolls 76
Motion of a solid through a liquid. H. S. Allen ... 1433
Poynting and Thomson 1433
Motors, increased use of induction motors in milling 1927
Motte's breaker 58
Mouchet, C., Harz jigs in the Vaucron mill 641
pointed boxes at the Vaucron mill 477
rolls at Vaucron mill 110
stroke of jigs 594
Vaucron, Var, France, mill for galena blende 1178
Mould for melting 784
Mount Bischoff, costs and results at 2046
mill. D. Clark 2034
stamps at 225
Tasmania, tin mill at 1182
tin dressing at. S. Fawns 2042
mill 1083
Hope mine, ore, magnetic separation of 810
Lyell Tasmania, costs of producing copper in .1957, 1958
Shasta, California, mill at 1047
Mounting a Blake breaker 18
of jig sieves 540
Moustier centripetal breaker 2010
Mouth of spindle and jaw breaker 54
feed openings of gravity stamps 166
Movable sieve power jigs, Bilharz oblong 503
Bradford eccentric 500
Conkling 503
Hancock vanning 504
Hooper vanning 505
intermittent 506
Robinson 504
Schranz 503
sieve continuous power jigs 499
hand jigs 495
method of working 497
table of practice in the mills 498
jigs 494, 1440
Hancock jig 1440
testing jig 627
tables for amalgamated plates 733
Movements, head motion for Card concentrator 1483
New Standard concentrator 1478
Overstrom table 1485
Wilfley slimer 1504
tables 1466
of breaker jaws 23, 34
Moving power of water 878
Moxham, E. C., concentration plant of the Bertha Zinc Company, Virginia 1180
Moyer mill ..... xxv, 910
mine, cost of hand picking at 1439
Mud in water 1105
sills for gravity stamps 152
Mules, cost of 1126
Mullan, Idaho, mill at 946, 1179
Muller 1137
grinding mills 1310
Hathaway 1310
Little Giant quartz mill, Oregon Muller quartz mill or Merrill's mill 1310
Muller, in amalgamating pans 245
mortar for cleaning amalgam 204
grinding amalgam 780
process for corundum 1078
Stanwood gravity 1285
Multiple jaw breaker 28
Mumford & Moodie dry separator 818
Mundic 900
Mundt 168
Mundt's screens 168
Munich, tests on strength of stone at 301
Munroe, H. S. viii
Blake breakers at Bonne Terre 57
breakers 57
comparison of the English and Continental system of jigging 1463
density of pulp on slime tables 695
Evans classifier 496
table at Lake Superior 728
figures on practice with Lake Superior hydraulic classifiers 390
formula for pulsion velocity in jigging 1460
gravity stamps 226
jigging copper at Lake Superior 640
laboratory slime table 1155, 2023
Lake Superior hog-trough classifier 401, 476
milling at Lake Superior 1174
new laboratory classifier 2020
Parson's jigs at Bonne Terre, Collom jigs at Lake Superior 640
Rittinger table 728
separation by jigs 640
sizing tests of jig products 607
of tailings in Mill 25 608
slime tables 697
steam, pneumatic, and gravity stamps 224
St. Joseph Lead Company's mill 1175
tests on hindered settling 626
Munroe's laboratory slime table 1155
Muntz metal amalgamating plates 747, 750, 1515
for amalgamation plates 1512, 2024
plates, preparation of 754
Murphys, California, Tustin mill at 1014
Muscovite, specific gravity of 1189
Musterschutz feeder 884
Mysore, India, cost of producing gold in 1981

N

Nacosari, Mexico, the new concentrator at. H. B. Layton 2036
Nagel, M. L., free-settling velocities 1421
Nagle's formula for belt transmission 97
Naphtha, specific gravity of 1189
Narod pulverizer 235, 282
bibliography for 297
National Concentration Company, description of the Woodbury system 1459
Drill and Manufacturing Company, Blake breaker 1203
Native amalgam 731
copper ores, mills for 990
Natural feed on Wilfley table 1471
Navaho mill 1092
Nederland mill, wear of amalgamating pans 249
Needle wire gauge 1195
Needles for screens, sizes of 172
Negaunee, Michigan, mill at 1185
Neill, J. W., on roasting and magnetism 814
Neodymium, atomic weight of 1188
Neon, atomic weight of 1188
Nernst lamp in Mill 171 ..... 1871, 1931
Net yield 1123
Neubert, E. W., analysis of products of hand picking at Freiberg, Saxony 492
and O. Bilharz xx
dressing at Freiberg, Saxony 1174
Neue Helene mill 1087
mine Hohenlohe Werke 1783
Neuerberg's mill, bibliography for 293
rolls 110
Neuerberg system of trommels 364
trommel 385
wet mill 233
Neuhof mill 1186
Nevada City, stamps at 230
Consolidated Copper Company 1866
Engineering Works, sample grinder 1284
Goldfield Reduction Company 1629
mills in 1174
sample grinder 1284

Newaygo Portland Cement Company, Newaygo separator ... 1360
screen, data on the ... 2018
separator ... 1350, 1360
table of capacities with various sizes of screens 1351
New Blanton cam ... 194
Bulfontein Diamond Co. ... 839, 1081
Caledonia, chromite mill in ... 1074
central mill of the Aktien Company ... 1786
ore dressing plant, Clausthal ... 1795
Century Blake breaker ... 1203, 1222
differential motion jig at mills ... 1760, 1765, 1812
disintegrating screen ... 2018
drop motion jig ... 537, 2022
jig ... 1444, 1459
magnetic separator, Knowles ... 1541
Chum Consolidated mill, amalgamated plates in 745
Comet mill, details of stamps ... 221
Newcum, W. A., ... 228
Elkhorn mill ... 1134
Newell & Newell, plates in Penn and Iron City mills, Colorado ... 789
stamps at the Penn mill, Gilpin County, Colorado ... 229
S. V., on drop of stamps ... 220
Newfoundland chromite concentrated by free settling 475
crushed by rolls, sizing test ... 99
sized in Richards' classifier ... 407
New Himmelfahrt mill ... 958
Newhouse mine and mill ... 2037
Mines and Smelter Company ... 1923
New Humboldt concentrator ... 1493
improved Huntington mill ... 1313
Jersey & Pennsylvania Concentrating Co., mill 1056
bluestone rock, treated in Frisbee Lucop mill 267
costs of milling in ... 1135
Iron Mining Company, mill ... xxix, 1055
mill in ... 1179, 1183
Zinc Company ... 1804
Kleinfontein Company, conveying belt at plant of mill, S. Africa, E. G. Wary ... 1585, 2039
Mexico, mill in ... 1180
stamps in ... 226
plate error ... 747
Primrose mill, detail of stamps ... 221
Smuggler concentrator ... xxvii
mill ... 1004
South Wales, stamps in ... 227
hydraulicking in ... 1006, 1179
Standard classifier ... 1369, 1373
concentrator ... 1478
W. G. Weatherby ... 2023
Newton gold mill ... xxviii, 1029
jigging mill ... xxviii
mill ... 227, 1047
mortar ... 165
rate of crushing in ... 165
shoes and dies ... 181
mortar ... 163, 227
slope of screens ... 176
Sir Isaac, law of eddying resistance ... 1425
New Woodbury concentrator ... 1494
York mill, acid water ... 173
Zealand, dredging in ... 1009, 1179, 1181
dredges in ... 1184
gold yield for April, 1899 ... 2049
plates in ... 788
stamps in ... 226, 227
water used in stamp mills ... 222
N. Henninger's limonite washer ... 895
Niagara crusher and pulverizer ... 233
bibliography for ... 294
Falls, power at ... 1090
pulverizer, sizing test on ... 315
Niccolite, specific gravity of ... 1189
Nicholas pulverizer ... 233
bibliography for ... 292
F. C., the Elmore flotation process ... 2030
H. S., slime settling ... 1414
Nichols Chemical Co., mill ... xxv, 905
slime table at Mill 174 ... 1478
Nicholson, Frank, blende in the Joplin district ... 1183
concentrating blende in Missouri ... 1183
Nichter spiral slate picker ... 2021
Nickel amalgam ... 730
atomic weight of ... 1188
in steel roll-shells at Mill 128 ... 1714
magnetic separation of ... 833
ore, dressing of ... 1185
specific gravity of ... 1189
Nip, angle of ... 89
for gyratory breakers ... 1218
rolls ... 1226
Nissen, Peter, tests at Boston Consolidated mill ... 2013
individual stamp mortar ... 1263
stamps at Boston Consolidated ... 1278
Home Run Mill, Prescott, Arizona ... 1264
Mill 165 ... 1850, 1851, 1852
capacity of ... 2011
at Mill 165 ... 1264
description of ... 2012
Niter for melting ... 784
Nitric acid used on amalgamated plates ... 752
Nitrogen, atomic weight of ... 1188
Nitze, H. B. C., and H. A. J. Wilkens, gravity stamps 224
magnetic separation ... 835
plates at the Haile gold mine ... 787
Wetherill magnetic separators ... 833
Norbom vanner ... 652
North Brookfield, Nova Scotia, ore from ... 1147
Nordberg Corliss engines ... 987
Manufacturing Company, tests on Nordberg steam stamps ... 1261
pump ... 998
rolls at Mill 182 ... 1911
single-cylinder steam stamp at Mill 179 ... 1897
indicator diagrams of ... 1250, 1251
test at Mill 181 ... 1250
steam stamp ... 997, 1004, 1247, 2011
comparison between single cylinder and compound ... 1254
foundations, anvil blocks, mortar beds, sills, and girders ... 1247
piston, piston rod, dash pot, flange, revolving pulley, stamp stem, stamp shoe of ... 1247
single cylinder ... 1249
steam cylinders, valves, and valve gears of 1249
tandem compound at Osceola and Tamarack ... 1254
steeple-compound steam stamp at mills ... 1894, 1895, 1901
North American Lead Company, Missouri, mill of the. 2042
R. B. Brinsmade ... 2042
Brookfield, Nova Scotia, plates at ... 765
Butte Mining Company ... 1836
Carolina, amalgamator ... 788
mills in ... 1180
separation of corundum in ... 9
Northey pump ... 1027
North Star mill ... 1175, 1182
California, A. D. Foote ... 2045
dies used in ... 180
Grass Valley, California, milling practice at the. G. E. Alexander ... 2043
mortar ... 165
plates in ... 787
stamps ... 224
foundation ... 145
wear of shoes and dies ... 183
Mines Company. A. D. Foote ... 1925
central mill of ... 1617
mill ... xxvii, 1018
mortar ... 161, 162
mouth ... 167
on Sultan mill ... 1050
Silverton Mining Company ... xxix
stamp mill ... 149
Nova Scotia, cost of milling in ... 1133
gold milling in ... 1174
ore, tests on ... 1117
mill in ... 1184
new mining plant at Salmon River. B. McDonald ... 2034
stamp milling. E. P. Brown ... 2034
mill practice ... 2043
Nozzles for water wheels ... 1090
Number of compartments on jigs ... 507
drops of stamps ... 215
Tremain stamp ... 138
jaw compared with spindle breakers ... 51
mills, key to ... xxv
sieves in jigs ... 524, 588
strokes on jigs ... 553, 592
See also Speed.

O

Oakum for caulking ... 735
Oberegger coal jig. V. Waltl ... 2022
gyrating screen ... 386

Oberegger jig for coal washing 2021
Occasional expenses 1123
Ocean water, specific gravity of 3
Ochre washing 1173
Octagonal revolving screens 1353
trommels 362
Octave mill. W. A. Root 2046
stamp mill, Weaver, Arizona. D. E. Bigelow.. 2043
Odell rolls 111
Odling magnetic separator 2028
Office for mill 1088
Ogle, J. P., breaking 59
fine jaw breaker 59
Oil, attraction of minerals for residuum. J. F. Hamilton 2025
concentration at Santa Barbara, Van Meter process 1993
in America, history of 2029
increasing efficiency of. A. Schwartz 2027
mill 1072
of a siliceous ore. C. M. Fassett 2029
ores. W. McDermott 2027
tests at Mill 172 1874
consumed in driers 880
cost of for breakers 49
engines 1091
for belts 1094
lubrication 1097
smoking moulds 784
process of separation 831
required for breakers 50
suited for use in Elmore process 1558
testing by 1155
Olcott, E. E., on cost of gold milling 1134
Old Bed magnetic concentrating mill 1059
Buchanan breaker, table of movements of 23
Clitters mine 1915
Dominion Copper Mining and Smelting Company 1882
copper handbook 1925
Globe, Arizona, concentration at. H. J. Baron 2043
English gauge 1195, 1999
screen gauge 173
wire gauge 1364
Oldham mill 732, 1133
amalgam from 765
blow of stamps 220
breaker in 60
chuck blocks in 177, 178
dies used in 180
Golden Gate table in 681
mortar 165
plates in 789
rate of crushing in 165
shoes in 181
stamp bosses 187
screens 169
stems 187
stamps in 228
wear of stamp shoes and dies 183
mortar 162
stamp mill 1184
Old Hundred mill, Howardsville, Colorado 2042
Jordan & Galena Mining Co., mill ..... xxv, 913
Star of the East mill, Australia, mercury wells in 769
gold caught in wells in 771
Union mill, Breckenridge, Colo., practice at the. D. H. Laurence 2045
Summit County, Colorado, flow sheet of the. D. H. Laurence 2046
Oligoclase, specific gravity of 1189
Oliver Iron Mining Company, washing plant for iron ores 1815
Olsen testing machine for strength of rock 311
One-current classifier 1144
Ontario, copper sulphide mill in. H. J. C. Williams. 2034
corundum dressing in 1181
custom mill at Keewatin. F. H. Probert 2040
dry stamping mill, sizing tests 210
mill 1134
amalgamating pans at 290
breaker in 57
silver mill 1174, 1179
Opal, specific gravity of 1189
Open-hearth high-carbon punched plate at Mill 180, life of 1902
Opening, discussion of the designations of size of. E. A. Hersam 2019
Opening for ventilation 1099
in wire screens, sizes of 1196
measurement of screen 1362
percentage of, in jig screens 546
Operating costs 1940
with all slime filter-pressing system 1648
American Process Company's driers 1599
Argall 4-tube drier 1600
Blaisdell system 1603
flotation processes 1562
minerals separation process 1561
Oxland roasting furnace 1549
Trego roasting furnace 1548
Operation of Blake breaker 16
canvas tables 700, 701, 702
circular slime tables 692
Gates breaker 1222
hand jigs 497
settlers 778
slime tables 684
vanners 657
Wilfley roasting furnace, attendance required for 1548
Ophir Con. Mines Co., Colorado, the mill of the .. 2044
Oppermann, M., Harz jig at Ammeberg, Sweden, Utsch jig 641
zinc dressing at Ammeberg, Sweden 1176
Orange peel dredge 1009
Order of drop of gravity stamps 1274
at Mill 100 ..... 1275, 1624
stamps 194, 214
at Mill 114 1661
Mill 117 1668
mills 1616
Ordinary direct plot 1142
Ore bins 842
breakers, Gates type 1222
concentrator, the Charleton 427
deposits of U. S. and Canada. J. F. Kemp ... 1924
dressing compared with smelting 1
divisions 5
principles, summary of 1611
granulating mill, Cummings 255
handling, Blaisdell system 1600
kind of, in gravity stamps 207
sorting in S. African gold mine. Webb and Yeatman 2021
testing 1136
washing at Elkton mine 1616
weighing of 883
weight of, before and after breaking 1190
Oregon, dredging in 1009
muller quartz mill 1310
Organization of labor in mill 1101
Oriental mill, amalgamated plates in 745
life of guides 155
mercury wells in 769, 771
Orion, Co., stamp mill 225, 1179
Oro Fina mill, heavy stamps 220
Plata mine, sizing tests of ore from 309
Oroville, California, dredging at 1008, 1012
concrete mortar block at 148, 229
Oroya-Brownhill mines, Australia, the reduction works of the. R. Allen 2045
Orpiment, specific gravity of 1189
Orthoclase, specific gravity of 1189
Osceola Consolidated Mining Co. 1181, 1906
copper handbook 1925
mill ..... xxvii, 131, 995, 1182, 1906
Burgan classifier at 1371
Lake Superior, Michigan. L. Fraser 2039
Nordberg tandem, compound stamps at 1254
slime tables in 697
Osmium, atomic weight of 1188
Osterspey, classifier invented by 421
discharge for jigs 582
jig 538, 642
siphon separator 478
Otago, dredge at 703
New Zealand, mills at 1180
plates at 788
stamps at 226
Ottawa Gold Mining Co. 1157
plates used by 741
vanners used by 657
Otto Abeling jig mechanism 641, 643
Ounce, equivalents of 1187
Ouray, Colorado, mill at 928
Ouro Preto, Brazil, amalgamating pan at 291
mill at 1182

Ouro Preto, Brazil, milling at 1173
stamps at 227
Outlines of mills 889
Outside amalgamated plates 731
fastening the plates to the tables 775
position of in the mills 733
principle of action 731
tables for supporting 733
total areas in mills 744
Ovens district, amalgamated plates in 745, 748
mercury wells in 769
plates in 788
stamps at 226
Victoria, mills in 1180
Overflow battery for gravity stamps 214
Overhead crab 199
Overlapping error on amalgamated plates 748, 757
Overshot water wheel 1036, 1089
Overstrom, G. A., experiments with launders 1592
concentrator 2023
sampler 2032
table 679, 1479, 1485
at mills ..1487, 1711, 1712, 1730, 1886, 1897, 1898, 1899, 1901
test at Mill 162 1493
Owen, F., gold stamp mills in the Remedios district 1182
tin placers in Perak, Malay Peninsula 1182
Owyhee mill, banking in stamp mortar 218
breakage of stamp stems 188
details of stamps 223
silver mill, amalgamation at 787
Oxidizing roast for magnetism 1995
Oxland furnace at Mill 137 ..... 1548, 1741
Oxygen, atomic weight of 1188
effect of in copper plates 750
Ozocerite, specific gravity of 1189

P

Pachuca cams at Mill 101 1626
stamp battery 1272
at Tonopah Mining, Milling, and Development Company 1272
Packard, G. A., dry concentration at Round Mt., Nevada 2038
Packing for jig screens 539
Paddock air jig 820
assay of products of 823
Pahang corporation, tin mill 1084
Pails for concentrates 1113
for moisture samples 846
Paint for mills 1089
table tops 1483
Palladium, atomic weight of 1188
specific gravity of 1189
Pallausch, A., graphite dressing in Bohemia 1177
Pan amalgamation 1167, 1517
cost of milling 1134
for silver, cost of 250
mills 1039
notes on 1520
settling tanks for 459
test 1157
bottom of amalgamating pans 241
conveyors 860
sampler 846
Pandora mill 1016
mill of Smuggler-Union Mining Company xxvii
Panning at clean-up 203, 266
gold ore, dry 825
Pans, amalgamating and clean-up 232
Colorado Iron Works grinding pan 1282
continuous grinding 1282
for amalgamating 239, 777
clean-up 250
diamond washing 1081
hand panning 1152
mixing at Mill 188 1921
washing 333
corundum and emery 333
grinding, Colorado Iron Works Company 1323
Australian practice 1283
sizing tests of pulp from 1284
wear of shoes and dies 1284
Hendy 683
versus tube mills 1282
in Australia, efficiency of grinding 2014
water for 1105
Pape-Henneberg dry separator 818, 828, 890, 891
Paper for lining cars 1113
used in retorts 781
Parabolic formula, Rittinger's 471
for free settling 472, 473
Parallel arrangement of machines 1110
rolls 1244
McFarlane 1232
Parallelism of rolls 71
Paramagnetic substances 796
Parent, pneumatic concentration at the Rheinpreussen, the Zollverein collieries, at St. Louis and Lagrange 837
Lucien, Karlik grizzly bars, trommels 385
Park City, speed of jigs at 593
Utah, mill at 1179
Parke and Lacy Company 30–34
Blake breaker jaw movements 34
Dodge breaker 28
sizing box 416
Giant rock breaker 22
Parker, R. A., false shoe 229
Parkhurst & Whipple on Griffin mill 284
Parkin, C., pneumatic stamps in Cornwall 143
Parkyn, T., tin dressing at St. Dennis, Cornwall .. 1184
Parlow, P. G., on weight of stamps 220
Parnall-Krause stamp mill mortar 2011
Parrot mill, Wilfley table at 675
Silver and Copper Mining Company 1836
mill ..... xxvi, 982
Parsons & Fisher jig 517
advantages of 518
construction of 525
disadvantages of 518
Cyril, Huntington mills in southern Rhodesia .. 1323
Huntington mills 2016
life of screens in Huntington mill 1317
wearing parts of Huntington mills 1317
Parsons' distributor 857
jig 640
size of sieve and plunger 529
water for 537
table 668, 682
Partial turbine 973
Partitions across jig sieves 574
Pasley, C. S., tin dressing in Bolivia 1183
Passau, Bavaria, Germany, mill at 1074
Path of grains in trommel 376, 377
settling particle 453
Patterson Elephant stamp 141, 143
Patton amalgamating pan 291
Paul, A. B., California and Colorado systems 228
milling 1184
Paul's arrastra 290
ball mill 293
Paving blocks, strength of 303
Paxman mill 282, 297
Payne, C. Q. viii
magnetic separator 799
mine, British Columbia, New Century magnetic separator at 1542
Peace River Phosphate Company 897
mill ..... xxv, 897
Peak Hill mine, amalgamated plates in 751
retort residue at 783
Pearce, Arizona, ball mill at 261
S. H. 884
and Caldecott, W. A. 1292
crushing efficiency of tube mills 1323
data on sampling 851
design of mining machinery 2048
discussion of H. A. White's results 1340
rules for sampling 849
sampler for tailings 884
tube mill grinding in S. Africa 2014
Pearl (Australia) mill, wear of shoes and dies in ... 183
amalgamated plates in 745
(Idaho) camp, milling in the 2043
Pearline for boiler scale 1027
Pebble, Florida, mill at 897
Pebbles, for tube mills, American. A. Lakes 2015
amount charged, formula for 1288
at mill 143 1770
C. C. Schnatterbeck 2016
consumption of 1291
for tube mills 1288
Peck's centrifugal elevator 2031
separator 828, 839
Montana, concentrating mill. G. W. Winter .. 2036
Pein, A. von, rolls with tension rods 112

Pelton water wheels 931, 935, 939, 945, 947, 951, 1015, 1019, 1020, 1021, 1022, 1023, 1029, 1032, 1034, 1089, 1090
at Mill 96 1619
for dredges 1013
Penalties on Joplin zinc ores 1939
products at Mill 148 1793
Penn and Iron City mills, plates in 789
mill, stamps in 229
effect of rapid drop of stamps 220
Pennsylvania, driving mechanism for trommels 357
mill, Grass Valley, Calif. 2036
Steel Company, Lebanon, plant of 1828
Pepler ore feeder. D. J. Pepler 2032
Pepler's operative device for the Challenge feeder. D. J. Pepler 2031
Perak, Malay Peninsula, tin washing at 1182
tin dressing at 1084
Percentage of extraction in mills 1115, 1932
moisture in ore 1106
opening in jig screens 546
screens 168, 369
Percy, C. M., picking belt of steel plates 492
reduction in rolls, diagrams of 1227
shaking riddles 385
Percussion tables, bibliography for 727
Bartsch rotary 1497
belt 1496
Perfection laboratory breaker 2009
ore feeder 1578
Perforated board for riffles 724
in classifiers 437
plate and wire cloth screens, for medium and fine work 340
plates in settling tanks 453
Peridotite weathering of 830
Periods of clean-up in steam stamps 134
Peripheral discharge tube mills of the Davidsen type 1297
overflow, depth of discharge *versus* velocity of discharge 1413
for slime tanks, use of lead strip for maintaining level 1406
wood strip for maintaining level .. 1407
Periphery speed of rolls 86
Perm mine, mill 1177
works, double discharge on jigs at. 584
Permeability for magnetic lines 792
of iron 792
Pernolet 101
A., Carr disintegrator 298
Rexroth, Lamarche and Schwarz coal jigs ... 641
ribbon theory of roll capacity 101
V., pneumatic concentration 641, 837
velocity of particles falling in water and air . 477
Perseverance furnaces at Mill 105 1637
Pestarena, Italy, mill at 1182
Peter McFarlane Sons Iron Works Company, Horn rotary slime concentrator 1499
Peters, hammers for breaking 11
spalling 11
E. D., Blake breaker at Sudbury, Canada 57
breakers 56, 57, 59
copper smelting xx
cost of breaking 51
dust chambers 885
hand *versus* machine breaking 59
rolls 109
Peterson, G. W., magnetic separation in Sweden ... 1569
Pfeiffer, J., Pfeiffer's mill 295
Pfeiffer's horizontal ball mill 234
mill, bibliography for 295
Pfordte, O. F., concentration at Casapalca, Peru ... 1180
edge runners 295
Frue vanners 728
Pheby, F. S., battery frames 158, 228
Phelps breaker 58
Philadelphia & Reading Coal Co., shaking screens 342
Graphite Co., mill 1075
Phillips 1035
dry gold concentrator. F. B. Allen 2025
J. A., amalgamation 787
for silver 1174
amalgamating pans 290
arrastra 290
gravity stamps 223
Krom's rolls 109
metallurgy xx
on height of discharge 213
silver amalgamation 1039
separation processes 839
Phillips, W. B. and A. Thies, stamp mill at Haile gold mine, North Carolina 1175
concentration in Alabama 833
of Cranberry ore in North Carolina 1180
cost of milling 1135
magnetic concentration in Alabama 833
of Cranberry ore in North Carolina... 835
roasting and magnetic separation of iron 1176
for magnetism 814
Wetherill separator in Alabama 835
Phlogopite, specific gravity of 1189
Phœnix atmospheric stamp 140
mill 143
false bottoms in mortar 180
inside plates 178
mortar 165
rate of crushing in 165
screens in 175
mine, stamp at 140
Phonolite and andesitic breccia crushed in Florence, Colorado 103
Phosphate dressing 1179, 1183
in Belgium 899
Phosphates in Tennessee, milling of. R. D. O. Johnson 2027
mill for 895, 897, 898, 899
of the Pyrenees 2033
treated by hydraulic nozzle 334
in log washer 327
washing 1180
Phosphor bronze cloth screens 174
plate screens 174
Phosphorus, atomic weight of 1188
Physical properties of minerals 2
adhesion 4
change of magnetism by heat 4
porosity by heat 4
color and luster 3
decrepitation 5
greasiness 4
hardness 2
magnetism 4
mineral aggregation 3
specific gravity 3
structure and fracture 3
tenacity and brittleness 2
Picker for slate 489
Picking. See also Hand Picking.
belts 1435
at mills ... 1438, 1617, 1737, 1749, 1806, 1815, 1842, 1871, 1875, 1882, 1889
detailed information on. E. H. Messiter ... 2021
of wire at Mill 137 1740
Robins conveying 1438
speed and capacity of 1438
chutes 489
cost of hand picking 1438
hand 480
houses 492
in the mine 481
block system 481
of rich ore for economy 481
on conveyors 489
shaking table 489
summary of, in the mills 491
tables 485, 486, 488, 492, 1435
annular Allis-Chalmers types 1435
at mills.... 1783, 1786, 1787, 1792, 1795, 1805, 1920
circular revolving 490
compared 491
Humboldt 1437
intermittent motion of 491
Krupp type 1435
speed and capacity of 1438
of 491
stationary 488
Pickling copper plates 748, 754
Pick points, removal of 882
Pictou, H. and S. E. Linder, action of arsenic sulphide solution on electrodes 1178
powers of metallic salts on arsenious sulphide 1178
Pierce amalgamators 1517, 1520, 2024
at mills 1517, 1660, 1661
Mill 114, saving effected 1663
W. I., gold milling in Nova Scotia 1174
Pierrefitte mines, France, mill at 1182
Sautter magnet at 798
Pike Hill mines 1891
copper handbook 1925

Pilling Air Engine Company, pneumatic hoists. 1608, 1610
table of sizes, capacities, speeds, weights, etc. of. 1609
Pillow blocks for rolls. 71, 80
Pinder concentrator. 1479, 2022, 2023
Pine board for amalgamation. 750
for riffles. 721
Hill coal washing, Pennsylvania. 2051
Pinite, specific gravity of. 1189
Pipe and plug jig spigot. 527
conveyor. 861
covering. 1091
discharge for jigs. 583
at Mill 137. 1458
distributors. 857
launders at Guanajuato. 1595
sampler. 845
sizes of. 405
steam for amalgamating pans. 243
Pipes for gravity stamps. 199
launders. 873
water. 1106
Pirchl, J., Meinecke classifier and *spitzlutte*. 478
Piston in jig discharge. 580
of Nordberg steam stamp. 1247
Pitch angle in trommels. 376
for smoking moulds. 784
Pitkäranta, Finland, magnetic separation at. 804, 836
plant at. E. Promosigh. 2047
Pittsburg and Montana Copper Company. 1836
coal jig. 2022
washer, drawings of. 2051
Pittsburg Foundry and Machine Co., rolls. 76
Monarch breaker at. 21
Silver Peak Gold Mining Company. 1634
Placer County, California, sizing tests of stamp pulp. 211
deposits, testing of. R. Nye. 2036
fields of northwest America. T. Tonge. 2040
gold. A McDougall. 2043
burlap processs for saving. D. Macquire. 2041
recovered by dry panning. 816, 825
ground, working of. J. W. Pinder. 2036
machines, dry. 838, 839
Tierra Seca. 838
material in sluices, mathematical discussion of the action of. L. St. Rainier. 2030
mines, cost of operation of. C. W. Purington. 2047
mining. See under Hydraulicking.
ancient stream gravel in. W. Lindgren. 2041
history of. J. M. Maclaren. 2039
in Alaska. C. W. Purington. 2042, 2045, 2047
costs of. C. W. Purington. 2041
British Columbia. 2040
California. G. L. Holmes. 2046
Columbia, S. America. F. F. Sharpless. 2037
Guiana. H. Tweddle. 2036
Siberia. 2046
the Philippines. G. D. Rice. 2036
on the Yukon. J. M. Bell. 2047
history of. 2035
plants. 1006
of La Cienaga, Sonora, Mexico. R. T. Hill. 2036
Alaska. L. M. Prindle. 2047
the Seward Peninsula. F. H. Moffit. 2047
tin plants. 1084
washing. 702, 723
Placerville, California, mill at. 1017, 1022, 1035
Placing of screens. 170, 373
the mortar in stamp mills. 148
Plain copper plates coated with amalgam. 747
quicksilver. 747
comparison of, with silver plated plates. 748
transverse troughs or riffles. 772
Plaminek, A., air blast for coal. 838
Hochstrate apparatus at the Rheinpreussen colliery. 837
Planet mill, bibliography for. 234, 294
Plant for mill. 1087
Plaque for vanning. 1152
Plate amalgam ratio of gold to silver in. 764
amalgamation. 1611
use made of, in mills. 890
annealing of, before amalgamating. 747
conveyors. 860
picking on. 489
gauges. 1194
glass launder linings. 1595
screens, cost of. 361
for gravity stamps. 167
Plate screens, stationary. 340
table of details of. 169
thickness of. 371
Plates, absorption of amalgam. 765
mercury by amalgamating plates. 1514
acid water on. 751
amalgamation. 1512
apron. 740
arrangement of. 737, 742
bibliography for. 787
buckling to remove hard amalgam. 760
cleaning. 757
coated with amalgam. 747
quicksilver. 747
connection to mortar. 735
copper and silver-plated. 764
versus silver-plated. 748
details of dressing and cleaning. 757
dimensions, area, and thickness. 744
distribution of amalgam from. 764
distributors and collectors. 743
dressing and cleaning. 756
drops between. 733, 743
due to cyanide, loss on. B. C. Wilson. 2024
effect of warm water. 750
for amalgamation, plain copper *versus* silver-plated. E. Halse. 2024
from battery, author advocates separating. P. Morgan. 2024
graphite coating on. 751
grease on. 751
gyrating. 741
how fastened to table. 735
inside amalgamated. 178
lip. 739
loss of gold on. 749
maintaining of right consistency. 756
materials for amalgamated. 747, 1514
method of electroplating. 754
miscellaneous. 741
Muntz metal, coated with mercury. 750
new scheme at Mill 66. 1026
of pure silver coated with amalgam. 750
on mortar lip. 739
splash board. 739
vanners and bumping tables. 740
outside amalgamated. 731
position of. 737
preparation of new. 752
principle of action. 731
proportions of gold and silver caught on. 763
removal of amalgam from. 757
spots and stains. 762
rubber for. 754
shaking. 740
sickening and flouring of mercury on. 751
slope of. 744
sluice. 740
sodium amalgam on. 752
speed of waves and thickness of film on. 746
stains on. 750
sulphuric acid used on. 752
sweating with hot water. 759
swinging. 741
tables for. 733
treatment of. 750
use of galvanic couple and electric current on. 752
versus mercury wells. 771
wire cloth for testing screens. 1138
with electric current. 740
yield of hard amalgam. 761
Platform elevators. 864
for gravity stamps. 156
scales. 883
Plating copper plates with silver. 754
Platiniridium, specific gravity of. 1189
Platinum amalgam. 730
atomic weight of. 1188
deposits of the Urals. C. W. Purington. 2033
in dredging, the saving of. 2040
scrap, recovery of. 1146
specific gravity of native. 1189
pure. 1189
washing in Russia. 2029
Platt mine ore, magnetic separation of. 810
Ploermel, France, mill at. 1177
Plomb, A. M., results from the Blake-Morscher separator. 2028
Plots of sizing tests. 1139, 1144
Plotting sizing tests. 1139

Plug spigot for jigs ... 598
Plumb circular jig ... 641
Plunger clearance on jigs ... 529, 530
feeders at mills ... 1749, 1750, 1751, 1853, 1857, 1864
on jigs ... 510, 511, 517, 528
throw on jigs ... 553
versus centrifugal pumps ... 868
Plungers and sieves, sizes of in mills ... 529
attachment of to the connecting rods ... 529
connecting rods for in jigs ... 530
Plush for tables ... 703
tables on dredges ... 1012
Pneumatic and spring stamps ... 113
belt concentrator ... 818
products of ... 818
concentration ... 815
See also Air.
bibliography for ... 837
concentrator, Hooper ... 820
hydraulic, and spring stamps ... 1246
jigs, Krom ... 824
pulverizer ... 236
bibliography for ... 299
separation at Mill 151 ... 1804
separators ... 1553
Freid gravity dry-process separator ... 1553
Sutton, Steele & Steele dry table ... 1479, 1554
stamps ... 139, 224, 1257
bibliography for ... 143
Hughes' ... 143
Krause's ... 141
Pocket in launders ... 873
Poech, F. J., Siemens and Friedrichssegen separators ... 833
Pointed boxes ... 412–416, 439, 475–477
at Friedrichssegen ... 450
details of ... 441
Rittinger type ... 411
tube classifier ... 421
Pole pieces for magnets ... 794
Poles of magnets ... 791
Polybasite, specific gravity of ... 1189
Pomeroy dredge ... 1013
Ponds for water ... 1105
Pontoon in hydraulicking ... 1006
Poor ore treated separately ... 1111
Porcelain lining for Alsing cylinder ... 267
Porosity changed by heating ... 4
roasting for ... 828, 890
Porphyry, strength of ... 301, 302
weight of ... 1190
Portable belt conveyor at Mill 135 ... 1735
conveyors at Mill 167 ... 1857
stamp mill ... 226
Portage Lake foundry ... 1446
Porter-Allen engine ... 1071
Dwight ... viii
electrolytic dissociation of slimes ... 1414
J. A., gold stamp mill at the Smuggler Union mine, Telluride, Colorado ... 1176
J. B., tabulated results of crushing tests ... 2017
S. R., Baliol mill, Sutters Creek, California ... 1184
Port Henry iron ore concentrated by magnets ... 802
magnetite crushed by Sturtevant mill ... 288
sizing test on ... 100
ore, magnetic separation of ... 798, 810
Portland mill, Colorado City, Colorado ... 2044
Cripple Creek, Colorado, practice at the ... 2042
Port Oram, New Jersey, mill at ... 1055
Position of amalgamated plates ... 737
Postlethwaite, R. H., dredging ... 2041
Kia Ora dredge, Feather River, California ... 1184
Posts for gravity stamps ... 153
Potash for cleaning mercury ... 786
Potassium, atomic weight of ... 1188
amalgam ... 730
Pot distributor ... 858
retorts ... 781
Potter flotation process ... 1555, 1561
D. Clark ... 1568
testing for ... 1993
Pound, equivalents of ... 1187
of water ... 1187
per square inch ... 1188
troy ... 1187
Powell, F., gold dredges on Snake River, Idaho ... 1181
the black sand problem ... 1511
Power. See Horse-power.
amalgam squeezer ... 1519
and efficiency of stamps ... 131
Power and Mining Machinery Co., improved Huntington mill ... 1311
range of adjustment of gyratory breakers 1218
rolls ... 1244
at Mill 166 ... 1856
size of crushed products from breakers . 1218
surface measurements in stone crushing by Von Reytt ... 306
applied to belt conveyors ... 860
computed for concentrator No. 1, Mill 173 ... 1929, 1930
cost of for breakers ... 50
crushing ... 315
in pan amalgamation ... 250
data in regard to ... 1927
effect of strength and specific gravity on ... 313
for Alsing cylinder ... 267
amalgamating pan ... 249
arrastra ... 238, 239
ball mill ... 261
Ball-Norton magnet ... 798
bucket conveyor ... 861
buhrstone mill ... 253
breakers ... 56
Brink & Hübner disintegrator ... 286
Bryan mill ... 272, 273
Cammett table ... 677
centrifugal pumps ... 869
clean-up pans ... 252
cone mill ... 256
Cylcone pulverizer ... 289
Delvik-Gröndal magnetic separator ... 804
Dodge pulverizer ... 262
Edison magnetic separators ... 813
electroplating copper plates ... 755
Ferraris magnetic separator ... 799
Fraser and Chalmers rolls ... 97
Frisbee Lucop mill ... 267
gravity stamps ... 204
Griffin centrifugal stamp mill ... 269
roller mill ... 283
Hancock jig ... 505
hand electromagnet ... 812
Heberli mill ... 258, 259
magnetic separator ... 799
Hooper air jig ... 822
Huntington mill ... 280, 281
jigs ... 596, 597
Krom air jig ... 824
Langley's dry crusher ... 274
magnetic separator used at Monteponi ... 810
mechanical batea ... 683
mills ... 1089
See Individual Mills in Chapter XX.
movable sieve jig at Przibram ... 500
Narod pulverizer ... 282
Pape-Henneberg dry separator ... 820
picking table ... 490
rolls ... 97, 112
Salzburg table ... 683
sample grinder ... 257
Sautter magnetic separator ... 798
Schmidt spiral screen ... 363
Schranz mill ... 275, 276
settlers ... 779
shaking screen ... 345
stamps, calculation of. A. W. Warwick ... 2044
steam stamps, table of ... 131
Stedman disintegrator ... 286
Sturtevant mill ... 288
trommels ... 357
Tustin's mill ... 262
vanners ... 663
and slime tables compared ... 692
wash trommel ... 330, 332
Wenström magnetic separator ... 802
Wetherill magnetic separator ... 805, 807, 808
Whelpley & Storer pulverizer ... 289
house for mill ... 1087
in crushing. E. A. Hersam ... 1340
jigs, Bilharz circular sieve ... 504
continuous movable sieve ... 499
Hooper vanning ... 505
intermittent movable sieve ... 506
Robinson movable sieve ... 504
Schranz ... 503
measures of ... 1188
of Blake and Dodge breakers compared ... 35
Cummings granulating mill ... 255
gravity stamps ... 219

Power of Husband stamp 141
rock emery mills 255
rolls 108
plant at mills..1639, 1675, 1680, 1698, 1709, 1712, 1723, 1730, 1757, 1768, 1794, 1802, 1827, 1830, 1835, 1856, 1859, 1863, 1871, 1874, 1887, 1895, 1899, 1906, 1912, 1913, 1914
required by agitators at Mill 103 1634
Allis-Chalmers suspended frame vanners .. 1503
toothed and corrugated rolls, table of . 1243
Alsing tube mills, table 1296
American Process Company driers 1599
Austin gyratory breakers, table of 1210
automatic tripper at Mill 174 1883
ball mills at mills 1830, 1914
Ball-Norton, belt-type magnetic separator at Mill 158 1825
drum-type magnetic separator at Mill 158 1822
type "M" magnetic separators 1825
Bartlett Simplex concentrators 1487
Bartsch rotary percussion table 1497
belt conveyors at mills....1634, 1667, 1690, 1691, 1707, 1709, 1768, 1769, 1771, 1772, 1853, 1882, 1883
percussion table 1496
Blake breakers at mills..1618, 1634, 1742, 1749, 1821, 1882, 1883
Blake-Morscher electrostatic separator 1551
Bleichert aerial tramway at Mill 130..... 1723
breakers at Mill 144 1771
Bryan mills at Mill 173...1879, 1928, 1929, 1930
Butters centrifugal agitating pump at Mill 118 1678
Card tables 1484
at mills.....1769, 1777
centrifugal pumps at mills..1634, 1688, 1694, 1695, 1696, 1711
Chalmers & Williams vanners at Mill 122..1687, 1688
cleaner jigs at Mill 148..... 1793
Cleveland-Knowles magnetic separators ... 1542
cobbing magnet at Mill 164..... 1849
Cole shovel wheel at Mill 124 1693
conveying and picking belt at Mill 139 ... 1749
crushing 1334
plant at Mill 174 1883
Davis rolls at Mill 144 .....1771, 1773, 1774
Denver Engineering Works Company's Blake breakers, table of 1204
Ding's magnetic separators 1541
at Mill 140 1759
disc conveyor 1583
dredges..... 1654
elevators at mills....1690, 1691, 1693, 1707, 1715, 1727, 1728, 1729, 1743, 1769, 1771, 1772, 1774, 1830, 1853, 1854, 1883, 1928, 1929, 1930
Elmore vacuum oil process 1558
Evans jigs at Mill 162 1930
Farrel-Blake breakers at Mill 124 1690
table of 1200
Ferraris ball mills, table of 1300
magnetic separators 1525, 1527
table at Mill 146 1786
tables of 1490
Forsgren magnetic separator..... 1539
Frayer pump at Mill 159 1830
Frenier spiral sand pump at Mill 126 1708
Frue vanners at mills 1694, 1695, 1929, 1930
Galena roaster 1548
Garland disc conveyors at Mill 124 1695
Gates ball mills, table of 1301
breakers at mills.....1635, 1706, 1713, 1727, 1768, 1830
style "K" breakers table of..... 1208
Gebrüder Sulzer centrifugal pumps at Mill 118 1678
gravity stamps 1274
Griffin mills at Mill 105 1636
Grill 4-compartment driers 1596
grinding pans at mills 1638, 1723
Gröndal magnetic separators 1537
at mill 159.....1828, 1830
Hadfield breakers at Mill 130 1719
gyratory breakers at Mill 130 1723
Hancock jigs 1441
at Mill 162 1930
Hardinge tube mills..... 1296
Harz jigs at mills..1692, 1693, 1694, 1728, 1729, 1772, 1773, 1774, 1775, 1877, 1878, 1879
Hathaway gyratory breakers, table of 1217
Power required by Horn rotary slime concentrator .. 1500
Humphrey rolls, table of 1235
Huntington mills at mills..1669, 1686, 1687, 1688, 1689, 1753
improved Huntington mills, table of 1312
individual machines at Mill 139 1757
Mill 154 1816
International magnetic separators 1535
at Mill 138 ..... 1746, 1747, 1748
James table 1491
Jeffrey conveyor at Mill 126 1706
swing hammer pulverizers, table of 1322
jigs at mills 1707, 1708, 1929, 1930
Kennedy gyratory breakers, table of 1214
Kent roller mill 1304
Knowles' New Century magnetic separators, table of 1542
Krogh pumps at mills 1634, 1929, 1930
Krupp ball mills at Mill 128 1714
gyratory breakers, table of 1215
Linkenbach table at Mill 146 1786
magnetic separators at Mill 152 1814
May Brothers' jigs at mills 1714, 1723
McCully gyratory breakers, table of 1212
breakers at Mill 139 1749
McLanahan and Stone single-roll crushers, table of 1241
Mill 97 1621
101 1629
105 1639
111 1656
114 1664
117 1676
118 1679
120 1685
123 1690
126 1709
128 1715
130 1723
132 1730
138 ..... 1745, 1746
141 ..... 1759, 1760, 1762
142 1768
145 ..... 1782, 1783
146 1786
147 1792
150 1802
151 1804
153 1815
154 1816
155 1817
157 1820
158 1823
159 1830
161 1840
162 ..... 1847, 1930
165 1852
166 1856
169 1865
171 1871
174 1887
175 1891
177 1894
178 1897
179 1899
180 1906
183 1914
184 1914
186 1918
Monadnock Chili mills at Mill 144 1775
Morris centrifugal pumps at Mill 139 1757
New Standard concentrator..... 1479
Nordberg steeple-compound steam stamp at Mill 180 1901
Overstrom tables at Mill 132 1730
at Mill 162..... 1930
picking belts at Mill 174 1882
raff wheels at Mill 128..... 1715
revolving driers at Mill 161 1762
Riblet aerial tramway at Mill 124 1696
rigid rolls at Mill 181 1906
Robins belt conveyors at mills..1636, 1637, 1750, 1830, 1876
Robins conveying and picking belt at Mill 132..... 1727
rolls at mills..1690, 1691, 1693, 1707, 1711, 1714, 1727, 1742, 1743, 1749, 1750, 1751, 1752, 1830, 1877, 1883, 1928, 1929, 1930
sampling department at mills 1667, 1884
Samson breakers, table of 1203

Power required by sand wheels at Mill 117..1668, 1669, 1894
scraper conveyor at Mill 126 1709
screw conveyors 1583
at Mill 105 1637
shaking feeders at Mill 124 1691
grizzly at Mill 124 1690
launders at Mill 124 .....1693, 1694
Sherman regrinders at Mill 132 .....1728, 1729
simple steam stamp at Mill 182 1909
stamps at mills.....1618, 1624, 1634, 1668, 1679, 1769
Stroud mills, table of 1320, 1321
Sturtevant balanced rolls, table of 1234
Dodge type breakers, table of 1205
emery mill at Mill 186 1918
rotary breakers at Mill 186 1917
testing plant at Mill 141..... 1766
trommels at mills..1690, 1691, 1692, 1693, 1706, 1707, 1714, 1742, 1743, 1749, 1750, 1751, 1752, 1771, 1772, 1773, 1774, 1830, 1928, 1929, 1930
tube mills 1289
at mills.....1634, 1770
Turbo log washer at Mill 154..... 1816
Ullrich magnetic separator 1535
vanner at mills 1634, 1778, 1930
various groups of machines at mills..1706, 1780, 1835, 1836
Vezin samplers at mills 1691, 1750
Wetherill magnetic separators 1525
Rowand magnetic separators at Mill 141 1763
Wharton magnetic cobber at Mill 157 1819
Wild roller mills, table of..... 1304
Wilfley slimers 1506
at Mill 132 1729
tables at mills ..1625, 1634, 1669, 1687, 1688, 1694, 1695, 1708, 1715, 1729, 1744, 1745, 1777, 1929, 1930,
Woodbury concentrators 1496
at Mill 117 1669
Worthington centrifugal pump at Mill 138 1745
at Mill 175 1890
rule for..... 1092
sources of losses in crushing 1325
summary for Mill 124 1698
tests at Mill 173 1927
transmission 1174
by rope 1094
transmitted by belts..... 1093
used by breakers 53
rolls 97
steam stamps 310
for breaking 50
friction of piston on water 603
on jig walls..... 602
inertia of starting 603
lifting sand 602
mechanical friction 603
oscillatory action 603
work of drawing the returning water down 602
in crushing 309
jigging 602
Practical limits of settling in settling tanks..... 455
Practice, roasting practice in Wisconsin 1548
Praseodymium, atomic weight of 1188
Pratt ore sizer..... 1345
A. H. Wethey 1360
at Mill 164 .....1346, 1850
-Wethey screen..... 2018
Precipitating agents for slimes..... 1416
Precipitation of gold solutions at Mill 117 1673
Prehnite, specific gravity of 1189
Preliminary breakers, classification of..... 1200
crushing 9
bibliography for..... 55
blasting in the mine 9
breaking by hammers 9
calcining for friability with or without quenching by water 9
machines 318
methods of 9
washers 319, 1341
bibliography for..... 334
purpose and classification 1341
Premier diamond mine 1922
mill, plates in..... 788
Premium for picking rich ore..... 481
Prentiss, G. W..... 1195
screen gauge 173, 1194
F. H., the Elmore flotation process 1569
Preparation of new amalgamated plates 752
Preparation of pulp previous to amalgamation 1514
Preservation of belts..... 1094
tailings 1114
Preserving timber for mortar blocks..... 147
Press for graphite 1075
Presses for amalgam, Chalmers and Williams power press 1519
Krupp press 1518
Pressure box in classifiers..... 419
exerted by rolls..... 311
machines compared with grinding 313
measures of 1188
of rolls 108
springs on rolls 73
Preston, E. B., amalgam 788
amalgamated plates.....733, 735, 745
arrastra 290
Blake and Gates breakers 58
breakers 58
Bryan mill 295
California gold stamp mills 1179
gold mill practice 1278
clean-up barrel..... 294
pan 291
Gates hydraulic classifier 477
gravity stamps 228
Griffin roller mill 297
Huntington mill 297
mercury traps 774
order of drop of gravity stamps 1274
shaking plates..... 741
stamping 225
vanners 663
stone breaker 2009
Prichard, W. A., definitions of slime 1398, 1419
Primosigh, E., separator at Pitkäranta, Finland 836
Principles and purposes of gravity stamps..... 1262
rolls 62
governing costs 1940
of action of breakers compared 52
classifiers.....387, 1368
Wilfley table group 1465
amalgamated plates 731
crushing machines 300
deep-pocket classifiers 409
electrostatic separation 1199, 1549
flotation processes 1199, 1555
gravity stamps 144
hindered settling..... 610
jigs 494
magnetic separators 1521
mechanical sampling 1574
operation of Wilfley slimer 1504
order of drop of stamps 215
ore dressing, general 1199
summary of 1611
pneumatic and spring stamps 139
pulsion, general 1460
pulverizers 231
roll crushing 1224
sampling 843, 849
screen sizing 366
bibliography for..... 384
separation, combined 891, 1611
stamps 113, 1246
suction 1461
vanner separation..... 665
Wilfley table 670
supplementary 5
used in mills 889
Prinz and Rau dust collector at Mill 141 1765
Prism form of trommels 361
Prister, A., slime settling 1178
Prize mill, acid water 173
Probert, F. P., comparison between Bryan mills and rolls for crushing jig tailings 1323
sizing tests on Bryan mills 1323
F. H., concentration of copper ore 1419, 1997
in Arizona 2033, 2037, 2041
custom mill in Ontario 2040
primitive Mexican mill 2038
Process, testing for 1161
Processes, flotation, principles of 1199
of separation, miscellaneous..... 790
Product of Blake and Dodge breakers compared ... 36
breakers, size of crushed 1218
table of sizing tests of..... 45
Hancock jig 505
hand jigs 498
picking 486

Product of jigs 553, 590
spindle and jaw breakers 53
Wilfley roasting furnace, fines sink in water . 1547
treated by rolls 63
Profit in concentration 1118
tailings piles 1114
maximum 1117
Progress Mining Company, Mexico, jigging at the mill of the. A. C. Mahl 2045
of ore dressing 1119
Progressive pulverizer 236
bibliography for 299
Properties of mercury 730
Propfe mill 235
bibliography for 297
Proportions between parts of stamps 189
of gold and silver on successive plates 763
stamps 190
Proprietary mine 1715
Proustite, specific gravity of 1189
Providence mill, Webb City, Missouri. D. T. Boardman 2039
plates in 789
shoes in 181
stamps in 230
wear of shoes and dies in 183
Provis, Richard and H. W. F. Kayser, tin dressing at Bischoff, Tasmania 1182
Prus, G., magnetic concentration 1182
plant at Mercadel, Kessler and Vial separators 835
Prussian mine, air separation at 820
Przibram, Bohemia, mill at 1180
breaker at 57
center discharge at 582
classifiers at 476, 477, 478
feeders at 884
hand picking at 492
Heberli mill at 259
jig connecting rods at 530
feeder at 549
screens at 540
jigs at 597, 640, 641
magnetic separator at 812
magnets at 833, 836
mill at 1096, 1174, 1176, 1177, 1185
moisture in ore 1107
movable sieve jig at 499
ore, sizing test of breaker product of 47
work necessary for crushing one kilo of different sizes of 308
power at 1089
for jigs at 603
trommels at 357
picking at 487
removal of jig tailings at 588
roasting for magnetism at 815
rolls at 110, 111
Salzburg table at 683
slope of jig sieves at 548
spitzlutten at 423
stamps at 224, 225, 229
stroke of jigs at 594
tables at 728, 729
tests on work required for crushing ore at 305
trommels at 385
Psilomelane, specific gravity of 1189
Pulley for gravity stamps 197
jigs 532
steam stamps 128
in gravity stamps 128
Pulp bed on vanners 661
consistency for Wilfley tables and vanners 1848
current in amalgamating pans 245
density for slime tables 695
for vanner feed 660
in amalgamating pans 246
thickeners 1394
amount of tank room required per ton of material treated. Mill 173 1413
at mills 1413, 1880, 1885
Ayton intermittent thick pulp extractor 1408
Berenger and Stingls slime tank 1407
Callow cone 1402
classification of 1401
Colorado Iron Works, slime tanks 1407
De Kalb's perforated-board classifier 1402
Merrill cylindrical clarifying tanks 1406
large cones 1406
Richards-Shepard *spitzkasten* 1401
Sherman tanks 1404
Pulp thickeners used at Mill 173 1408
Pulsating screens 342, 1348
Centripact screen 1352
impact screen 1351
Imperial ore screen 1348
in the mills 1346
Newaygo separator 1350
Vibracone separator 1352
Pulsator classifier at Mill 175 1890
direct form 1391
Richards' 1388
use with jigs and tables 1478
house for diamonds 1081
jig, Richards' 1453
table of sizes, capacities, and dimensions .. 1455
Pulsion and suction in jigging 1460
investigated in the mills 632
on air jigs 826
hand jigs 499
jigs 533
adjustment of 598
tests on 628
general principles of 1460
in jigs 494
jigs 518, 520, 538, 610
definition of 558
for hindered-settling tests 623
velocity in jigging 1460
Pulsometer pump 871
Pulverizers, Bartle 294
bibliography for 289
Cunnack's 293
Cyclone 288
bibliography for 298
details of 232
Dodge improved 262
Griffin 299
Howland No. 1, bibliography for 297
Jordan's 299
Leviathan 299
Meihe's 299
Merrall's, bibliography for 296
Michell and Tregoning 292
Morey and Sperry 295
Narod 282, 297
Nicholas, bibliography for 292
other than gravity stamps 231
penumatic, bibliography for 299
principles of 231
purpose of 231
Thompson's, bibliography for 294
Tregoning 297
Walker 299
Whelpley and Storer 289, 299
Pulverizing mill, Tustin's rotating 262
Pumice used in cleaning copper plates 754
Pumping costs at Mill 180 1906
plant at mills 1709, 1757, 1859, 1881, 1895, 1899, 1906, 1912
water 1105
Pumps, bibliography for 884
centrifugal 1610
sand 1588
displacement 1610
for handling pulp, centrifugal and Frenier 1610
sand and water 868
water supply 871
in mills. See Individual Mills in Chapter XX.
Oregon, five step 2033
Lancaster rotary 1589
sand 1587
versus sand wheels in Witwatersrand 1645
Punched plate jig screens at mills 1792, 1869
screens 385
compared with wire cloth 171, 354
Punching screens 223
Punchings for jig beds at Mill 127 1459
Purification of mercury 785
Purington, C. W., dredging in Siberia 2035
platinum in the Urals 2033
Purity of concentrates 1118
Purpose of classifiers 389, 1367
jigs 494, 552
affecting number of sieves 589
preliminary washers 1341
pulverizers 231
rolls 62
stamps 113, 1246
power and capacity of Huntington mill 280

Purtscher, E. ... 1185
Push conveyors ... 1582, 1584
at Mill 105 ... 1637
feeders at mills ... 1581, 1636
Pushing block feeder ... 855
Putting on new shoes ... 201
Putty knife for scraping plates ... 762
Pyramid form of trommels ... 361
Pyrargyrite, specific gravity of ... 1189
Pyrite and blende separation ... 900
angle of nip required to crush ... 94
concentration in New York ... 2038
crushed in Mill 13 ... 47
dressing in Massachusetts. J. J. Rutledge ... 2038
plant of the Verein Chemischer Fabriken ... 1914
for jig beds ... 574
in New York, concentration of. R. Brinsmade ... 2037
mill for ... 904, 905, 958, 961, 965
milling in New York ... 2047
ore, mill for ... 900, 909, 910, 913, 915
test on ... 1165
weight of ... 1190
rendered magnetic by heat ... 814
roasted for magnetism ... 1544
porosity ... 828
specific gravity of ... 1189
with quartz and porphyry crushing in Mill 20 ... 95
Pyrolusite, speeific gravity of ... 1189
Pyrometer for regulating temperature in Wilfley furnace ... 1548
Pyromorphite, specific gravity of ... 1189
Pyroxene, specific gravity of ... 1189
Pyrrhotite, hindered-settling test on ... 617, 619
settling velocity of ... 466, 469
specific gravity of ... 1189

Q

Quaker mine, Huntington mill at ... 281
Quality of copper for plates ... 747
crushing by breakers ... 47
rolls ... 98
feed for vanners ... 658
product of Blake and Dodge breakers compared ... 36
work of classifiers ... 461
trommels ... 380
Quantity crushed by rolls ... 100
of hydraulic water in jigs ... 598
water for stamps ... 221
in rectangular launders ... 878
on circular slime tables ... 694
vanners ... 659
Quart, equivalents of ... 1187
Quartering, coning and ... 1577
for sampling ... 844
Quartz and galena, jig tests on ... 629
used for film-sizing tests ... 707
sphalerite, jig tests on ... 628
angle of nip required to crush ... 94
film-sizing tests on ... 707
free-settling velocity ... 471
grinding of ... 2017
hindered-settling test on ... 617, 622
in Banner mine ... 148
mill, Bryan roller ... 271
ore, capacity of Tremain stamp for ... 138
pulsion jig test on ... 624, 625
pyrite ore, treated by Summit Mining and Smelting Company ... 674
separating chalcopyrite or blende from ... 720
separation from gold by amalgamated copper plate ... 4
settling velocity of ... 466, 469
specific gravity of ... 1189
treated by Dodge improved pulverizer ... 262
in Mill 4 ... 502
weight of ... 1160, 1190
Quartzite, picked from gold in rock houses in the Rand, South Africa ... 482
strength of ... 301
Quebec asbestos dressing practice ... 1916
Queen & Co. ... 1159
Mary colliery, centrifugal apparatus at ... 820, 838
Quéhant, Ch. and O. Dupont, dressing lead and zinc in Belgium ... 1185
Quenching for breaking rock after heating ... 9
Quicklime in retorting mercury ... 785
Quicksilver. See Mercury.
mill for ... 1177, 1183
Quicksilver ore, dressed at Idria, Austria ... 481
ores the dressing of, ... 1074
Quincy granite, result of crushing ... 33
mill, stamps in ... 230
Hubbell, Michigan ... 2041
practice of the. C. K. Hitchcock, Jr. ... 2037, 2047
Mining Co. ... 1181, 1908
copper handbook ... 1925
mill ... xxvii, 998

R

Raborg, W. A., separating graphite from gangue ... 1186
Radiators for heating ... 1099
Radium, atomic weight of ... 1188
Radius of slime tables ... 697
Raff wheels ... 864, 1609
at Mill 128 ... 1715
for new Humboldt concentrator ... 1494
Wilfley table ... 1468
Rag frames ... 1083, 1507
Raglan Township, Ontario, mill at ... 1078
Raibl, mill at ... 1177, 1185
rolls at ... 110
Salzburg tables at ... 1115
Railway Master Mechanics Association on screen gauges ... 173
Rain to settle dust ... 1099
Rainy River district, Ontario, mill in ... 1178
Rakes for discharging jig concentrates ... 502
Ramsbeck, hand picking at ... 492
Luhrig table at ... 670
mill at ... 1086, 1102, 1121, 1177
picking at ... 487
sieve scale at ... 367
Ramsey sludge tank ... 446
Rand, cost of hand picking on the ... 487
district, circular tables in ... 491
sampling in ... 849
tailings wheels in ... 865
weight of quartz ... 1160
hand picking on the ... 492
metallurgical practice ... 1419
G. A. and H. S. Denny ... 1923
mill equipment. G. A. and H. S. Denny ... 2041
milling practice ... 2013
mills on the ... 1185
ores, slimes from ... 1121
slime treatment on the ... 1410
Randolph, J. C. F., amalgamation plant at Batopilas Chihuahua, ... 1174
Blake breaker at Clausthal ... 57
breakers ... 57
dressing at Clausthal ... 1174
gravity stamps ... 223
Harz jigs at Clausthal ... 640
pointed boxes at Clausthal ... 476
rolls at Clausthal ... 109
stroke of jigs ... 594
trommels at Clausthal ... 385
mill, acid water ... 173
Range of sizes fed to jigs ... 606
Rapid City chlorination works, trommels at ... 354
Economy individual mortar ... 1266
stamp ... 1261, 1278
a camless stamp ... 2012
Mill Company, Rapid Economy spring stamp ... 1261, 1278
Rasch, ball mill of Siller and Dubois ... 293
Rate of travel of ore in trommels ... 375
Ratio between quartz and galena, hindered settling ... 1460
total horse-power and that to overcome gravity in gravity stamps ... 205
for currents in testing classifiers ... 1146
free to hindered settling ... 1430
hindered settling ... 617
from experiment ... 1428
theoretical value for ... 1427
of concentration. See Individual Mills in Chapter XX.
feed to space between rolls ... 90
gold to silver caught on successive plates ... 763
reduction for rolls ... 1226
gyratory breakers ... 1218
sieve hole to jig feed ... 573
Ratios for free settling ... 469, 471
hindered settling ... 625
sieve scale ... 367
free settling of quartz and galena ... 1426

Ratios free to hindered settling, application to classifier design 1432
interstitial, for jigs 627, 630, 631
of settling, definition of 4
weights of stamps and mortars 164
table of free settling 1426
Rauft, T., gravity stamps 225
Huntington mill 297
Ray Copper Company, the mines of the. A. Hill ... 2036
Raymond automatic pulverizer 236
George P., separation by decrepitation and screening 1565
roller mill 2014, 2017
R. W. 884
amalgamating pans 291
Balch's magnetic separator 834
breakers 57
Crocker's stamps 229
double-cone classifier 426
gravity stamps 223
jaw plates 57
mortars 230
sampling in testing mills 1175
weathering at Meronitz, Bohemia 839
Reaction wheel for sampling 848
Read, Thomas T., absorption of mercury by amalgamating plates 1515
amalgamation of gold ores 1520
effect of temperature on amalgamation 1516
Realgar, specific gravity of 1189
Reardon, Ph., Colorado gold stamp mills 1184
construction of jigs 643
Receipts 1123
Receiving cone for trommels 358
floors 842
Recovery of brass from chips 2025
gold from ashes 177, 702
from waste 482
gold in different parts of mill 749
metals from skimmings 2025
in refuse 2025
waste in stamp mill 266
Rectangluar buddle 706
Red Metal Mining Company 1836
River, Cornwall, tin washing 1182
tin works 1082
Reducing roast for magnetism 1995
Reduction, amount of, in rolls 92
of iron ore to magnetic oxide 813
ratio of, for gyratory breakers 1218
with rolls, diagram of percentage 1227
Reed dry placer machine 838
S. A., sampling 884
Reese River process of amalgamation 248, 1039, 1173
Refining at Mill 117 1674
cost at Mill 106 1643
plant of Mill 106 1643
Reflectoscope for measuring mineral grains 1996
Re-grinding machines 2014
M. Schwerin 1340
relative efficiency of 1331
Regularity in feeding 1114
Regular mill testing 1168
Regulation of height of discharge in stamps 212
temperature in Wilfley roasting furnace with pyrometer 1548
Regulators for water 858
Reichenecker, A., amalgam 788
dressing gold ores in Colorado 1177
gravity stamps 224, 229
Reifsnyder, Shimer and, sampling 884
Reinforced concrete bins at Mill 160 1834
Relation of angle of nip of rolls to feed and space 92
rolls to angle of nip 94
speed of current to size of grain in settling tanks 452
surface to diameter of ore particle 305
weight to surface of crushed product 310
Relative proportion of gold and silver in daily amalgam as compared with hard amalgam 762
on successive plates 763
Reliance rolls 82, 111
at mills 1750, 1751, 1752, 1822, 1825
self-tightening cam 229
Reluctance in magnetic field 792
Remedies for sickening of mercury 751
Remedios district, Colombia, mill in 1182
Removal of amalgam from plates 757
coarse concentrates in jigs 576
concentrates on jigs 586
Removal of jig tailings 587
products of slime tables 689
stains on plates 751
sticks, bolts, pick points, etc. 882
wood at Mill 164 1607
from ore previous to crushing at Mill 164.. 1849
Repairs. See also each machine.
cost of for breakers 50
in vanners 663
in mills, cost of 1129
on Blake breakers 24
jigs 604
rolls, cost of 104
Wetherill magnetic separators, cost of 1525
Reports 1122
Republic gold mine 1176
Repumping water 1104
Reserve capacity in mills 1109
Reservoirs, clarifying 460
for water. See Individual Mills in Chapter XX.
Resetting tappets 201
Residue after retorting 783
Residuum oil for separation 831
for oil testing 1155
Resin for belts 1094
smoking moulds 784
Respirators 1100
Results at Mill 187 1920
of classifying limonite ore 405
film-sizing tests 719
free-settling tests 466
the tubular classifier tests 613
Von Reytt's power and surface measurements. 306
Retorting amalgam 781
loss in 783
Retorts 1519
for amalgam 781
sealing of 1519
Re-treatment plant (proposed) at Mill 152 1814
Revenue tunnel mill 931
Mines Co., mill ..... xxvi, 928
Reverberatory furnaces for roasting 814
for porosity 829
previous to magnetic separation 1544
Revere Rubber Company, conveyor belt at mills 1706, 1709, 1819
"Silverton Brand," elevator belting at Mill 126 1707
Revolutions. See speed.
and periphery speed of rolls 87
of rolls 88
slime tables 696
steam stamps 128
trommels 349
Revolver for bottle tests 1157
Revolving circular concave slime tables 692
convex slime tables 686
convex slime table, Clark table 689
devices used on 689
Evans table 689
Schranz table 689
picking table 490
cylindrical furnace (Oxland) at Mill 137 1741
distributor 1418
driers 880
at mills 1746, 1762
knife buddle 328
Ball's 334
screens 346, 1353
classification of 1353
cones, pyramids, prisms 361
Gates all-iron frame 1353
King screen 1356
octagonal 1353
revolving grizzly of the Denver Engineering Works Company 1353
sectional 1353
submerged trommel 1355
strakes 725
Rexroth coal jig 641
Reynolds boilers 997
Corliss engine 1003
Edwin viii
mill, fineness of amalgam 764
Oscar, sealing amalgam retorts 1519
Reytt, K. von 60, 110, 1185
apparatus for classifying 477
crushing machines at Przibram 316
gravity stamps 229
jaw breaker 60

Reytt, K. von, Karlik gyrating screen 386
screen and jig at Przibram 1185
Linkenbach tables 729
mill machines 1177
moisture in drained ore 1185
rolls *versus* other crushing machines 112
Schranz mill 296
Rheinpreussen colliery, air blast at 837, 838
Hochstedt apparatus at 816
Rhenish provinces, mills in 1176
Prussia, picking in 481
Rhodesia, S. Africa, milling practice at. F. C. Roberts 2044
Rhodium, atomic weight of 1188
Rhodochrosite, specific gravity of 1189
Rhodonite, specific gravity of 1189
Rhyolite, weight of 1190
Ribbon theory of roll capacity 101
Ribiet aerial tramway at Mill 124 1696
Rice, C. T., Kinkead mill at Goldfield, Nevada 2038
milling at Virginia City, Nevada 2038
Richards annular vortex classifier 406, 1382
at mills 1692, 1693, 1694, 1710, 1711, 1712, 1743, 1751, 1752, 1753, 1755, 1774, 1775, 1776, 1778, 1816, 1867
classifiers at mills 1829, 1885, 1886
Coggin hydraulic classifier 391, 1367
at mills 1878, 1879, 1896, 1898
details of in mills 393
J., centrifugal pumps 884
jig discharge 580
stamps *versus* other crushers 229
pocket vortex classifier 1373
pulsator classifier 1388, 1419
direct form 1391
fourteen-day test at Mill 162 1391
nine-day test at Mill 162 1394
table of sizes, capacities etc., of 1390
jig 1453, 1459
depth of bed 1456
operation of 1455
size of feed for 1456
table of sizes, capacities and dimensions .. 1455
test on 1456
Rapid Economy stamp 2012
R. H. and Locke, C. E., dressing of tin ores .. 1924
tests on a surface current box classifier . 477
A. E. Woodward, curves for free-settling particles from Rittinger's formula 476
concentration of black sands 2047
edge runners 295
experiments to determine laws of jigging 640
glass classifier and slime table 1176
gravity stamps 223
Richards-Coggin classifier 476
school laboratory work a free milling gold ore . 2048
sieves, classifiers, and jigs 1175
silver amalgam 787
slime tables 728
spitzlutte 476
study of the Wilfley table 1511
on different feeds 2022
testing a jig 1176
for a mill process 1183
jig 1174
typical methods of milling in Missouri 2040
undercurrent for saving black sands 1419, 2020
velocity of galena and quartz falling in water 1433, 2020
particles falling in water 476
shallow pocket classifier 401
hindered-settling classifier 1384
hydraulic classifier, estimated capacities of with different sizes of sorting columns .. 405
sizing test of products of 406
Shepard *spitzkasten* 1401, 1419
tests of power required in crushing by rolls 311
tubular classifier 428
undercurrent 1386
Richardson automatic weighing scales 1872
at Mill 132 1727
C. S. 1276
order of drop of stamps 1278
Rich ore picked out for economy 481
treated separately 1111
Rickard, T. A., across the San Juan mountains 1923
adaptation of gold stamp mills 1181
amalgamated plates 735, 737, 745, 747, 750, 762, 768, 787
amalgamating pans 290
Rickard, T. A., amalgamation 787
at Ballarat, Australia 788
Clunes, Australia 788
Hidden Treasure mill, Colorado 788
Premier mill, Otago, New Zealand 788
in the Thames district, New Zealand 788
breakers 56
canvas and blanket tables; vanners and bumping tables 728
Colorado system *versus* California system .. 227, 1175
copper mills of Lake Superior 1419
Gilpin County, Colorado, and California methods of gold stamp milling 1181
gold milling in Australia 1180
stamp mills at Bendigo, Australia 1180
Clunes, Victoria 1180
Grass Valley, California 1180
Otago, New Zealand 1180
Thames, New Zealand 1180
in Amador County, California 1180
Gilpin County, Colorado 1180
the Black Hills, South Dakota 1181
the Ovens district, Victoria 1180
gravity stamps 223, 224, 226, 228
mill of the Guanajuata Reduction & Mines Company, Mexico 2045
milling in Lake Superior 1997
mills at Bendigo, Australia 788
mortars 164, 165
narrow sluice plates 788
order of drop of stamps 215
plates and traps in the Black Hills 788
and at Grass Valley 787
at Grass Valley, California 788
in Amador County mills, California 788
the Ovens district, Victoria 788
pneumatic concentration 837
removal of sulphurets from mercury 770
rock breakers 56
shoes and dies 181, 183
size of plates 788
sluice plates 740
stamp milling 1030, 1174
of gold ores xx
in United States, Australia, and New Zealand 227
mills at Ballarat, Victoria 226
Clunes, Victoria 226
Otago, New Zealand 226
Thames, New Zealand 226
in the Black Hills 227
and at Grass Valley 1176
Gilpin County, Colorado 226
stamps for different purposes 227
steam stamps for gold in Black Hills 142
water used in stamp mills 222
Ricketts, L. D. 1875
power tests by 1927
Riddles 341, 384
and vibrating grizzlies 1346
comparison of 345
versus trommels 365
Ries, Heinrich, basin washers and wash trommels .. 335
washing clays 1183, 1186
Riffle bars on revolving strakes 725
blocks 721
boxes, with mercury 724
cleats, arrangement in Deister concentrators ... 1488, 1489
cast-rubber for 1487
copper 1486
for 1481
Deister concentrators 1488
for New Standard concentrator 1479
Wilfley tables 1467
height of 1468
material for 1467
"tacking on" *versus* "grooving" 1498
grooves of Card concentrator, shape of 1483
tables 670, 1120
mills 1004
on dredges 1007, 1008, 1012
Riffles 720, 1507
application of 723
bar 721
bibliography for 727
Caribou riffle 1509
cocoa matting, expanded metal and iron mesh in dredges 1653
containing mercury 768, 770

Riffles containing mercury, advantages and disadvantages ... 771
depth of bed ... 1511
expanded metal ... 722
for gold dredging ... 703
mercury traps ... 772
sampling ... 844, 1570
forms of ... 721
used in sluices ... 723
Grass Valley ... 770
Howland ... 722
Hungarian ... 725
La Point suspended riffles ... 1509
on dredges ... 1012
tables ... 675–679
advantages of ... 679
Wilfley table ... 672
plain transverse ... 722
principle of ... 644
revolving strakes ... 725
Robinson ... 721
rock ... 721
sluice ... 1464
timber riffle blocks ... 721
undercurrents ... 726
use upon slimers ... 1498
Rigid rolls ... 112, 2010
at mills ... 1237, 1865, 1893, 1901, 1906
Denver Engineering Works Company, description of ... 1235
Right and left hand cams ... 195
Ring and cone for sampling ... 844
for amalgamating pan ... 244
stamp cams ... 192
head ... 185
steam stamps ... 120
Rings, details of, from mills ... 122
Rinsing cylinder ... 335
table for hand picking ... 488
Risdon Iron Works ... viii, 1859
amalgamating pan ... 243, 244, 245, 246, 247, 249
Blake breaker ... 22
Bryan mills at Mill 173 ... 1928
clean-up pan ... 251
crack-proof vanner belt ... 1503
dredge ... 1653
open-connected type ... 1654
vanner ... 651, 652
weight of spider and driving cone made by ... 247
Rittinger, beveled rolls ... 71
capacity of jigs ... 597
coarsest size jigged ... 605
concave buddle ... 706
double trough classifier ... 416
duck tables ... 702
feeding rolls ... 71
figures on hand jig ... 49
formula for amount of throw of jigs ... 595
free settling ... 471, 1421
hammers for breaking ... 11
hand jigs ... 497, 499
jig ... 643
mechanism ... 537
plunger clearance ... 530
length of jig sieves ... 592
movable sieve power jig ... 507
parabolic formula ... 471
pointed boxes ... 411, 439
tables of sizes of ... 440
power for jigs ... 603
required for crushing ... 313
principles of ore dressing ... 1175
P. R. von ... 330, 334, 342, 434, 1038, 1059, 1104
amalgamation ... 787
Blake breaker ... 56
breakers, hammers, and roasting for friability ... 56
buddles, percussion tables, slime tables ... 728
Carr disintegrator ... 298
cone mill ... 292
crushing machines ... 316
details of hand picking ... 492
edge runners ... 295
elevators, sand wheels, and conveyors ... 884
fluted rolls ... 109
gravity stamps ... 223
grist mill or buhrstone mill ... 291
Harz jigs movable sieve jig ... 639
Lehrbuch ... xx
magnetic separators ... 832
mathematical discussion Cornish rolls ... 109
mill schemes ... 1174
Rittinger, P. R. von, movable and fixed sieve jigs, setzpumpe ... 639
pointed boxes, *spitzlutt*, runs ... 479
schleudermühle ... 299
separation by centrifugal force ... 839
settlers ... 787
setzpumpe and Harz jig ... 639
sieve scale, screens, riddles and trommels ... 385
spalling and cobbing hammers ... 56
trough washers ... 334
rectangular buddle ... 706
roll speeds ... 87
round convex buddle ... 704
rule for middlings ... 1086
runs ... 448
separation by centrifugal force ... 827
setzrad ... 478
sieve scale ... 366, 1144
double ... 1361
for testing screens ... 1138
skimming sieves ... 577
slope of jig sieves ... 548
tables ... 667
spalling ... 11
specific gravity test ... 1159
spitzkasten ... 433, 1367
principle ... 409
spitzlutte ... 422, 424, 477, 773
stay battery ... 229
and overflow battery ... 214
stroke of jigs ... 594
sweeping table ... 703
table ... 667
compared with Wilfley ... 679
theory of advantage of jig over free settling ... 625
crushing ... 304
jigs ... 533
thickness of screen plate ... 372
under-piston jig ... 520
velocity of stroke of jigs ... 595
wash trommels ... 329
width of jig sieves ... 591
River dredging for gold ... 1009
pebble phosphate ... 895
Roasted blende and pyrite, jigging of ... 640
Roasting and magnetism ... 900
arsenopyrite for magnetism at Mill 185 ... 1916
for friability ... 56, 57, 58, 839
leaching ... 1168
magnetism ... 790, 799, 800, 813, 1543, 1544, 1611
at Mill 148 ... 1793
bibliography for ... 832
effect of carbon in ... 1544
experiments in roasting pyrite ... 1544
in testing ... 1995
minerals which become magnetic on roasting ... 1995
use made of, in mills ... 890
porosity ... 828, 839, 890, 1611
wolframite in tin ores ... 1081
furnaces ... 1545
at Friedrichssegen, Germany ... 1546
mills ... 1663, 1747, 1759, 1765, 1862
Dings ... 1548
Galena ... 1548
Howell-White ... 1545
at mill 148 ... 1792, 1793
Mathey, at Mill 148 ... 1793
McDougall type ... 1546
Oxland furnace ... 1548
Trego ... 1548
at Mill 148 ... 1792
Wilfley furnace ... 1546
iron ore ... 58
ore, effect on power required for crushing ... 313
practice, Wisconsin ... 1548
silver ores ... 1039
tin ores ... 1082
to remove calcium sulphate ... 816
Robbins, A. C., amalgamation and concentration at Dayton, Nevada ... 1184
Robert, F. C, Carr disintegrator ... 298
cost of constructing a 20-stamp mill ... 2049
Huet and Geyler's jig ... 641
North Star stamp mill at Grass Valley ... 1182
Roberts, slime table ... 691
Robillard mine mill ... 1183
Robins belt conveyor ... 805, 859, 1585, 1610, 2031, 2033
at mills ... 1636, 1637, 1661, 1727, 1750, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1821, 1822, 1823, 1824, 1825, 1826, 1828, 1876, 1913

Robins belt conveyor in Blaisdell system 1602
stamp mills 2031
picking belt 1438
at the West Aurora mill 2021
Thomas, Jr., Robins belt, rollers, etc. 884
Robinson coal washer (classifier) 478
Deep Gold Mining Co., Ltd., mill of 1648
Diamond Mining Co. 839
gold mine, mill at 1184
jig 504
mill, details of stamps 221
riffle 721
washer for coal 447
Roche-la-Molière colliery, coal washing at 2050
Rochelt, F., automatic slate picker for coal 493
Rocheux, double discharge on jigs at 584
Rock breakers. See Breakers, Jaw Breakers, Spindle Breakers.
breakers 13
Gates' style "K" 1207
Hathaway gyratory 1215
in reserve 1109
kinds of 13
Krupp 1202
gyratory 1215
location of 1109
McCully gyratory 1210
method of operating 13
separate motor for 1092
emery mill 232, 253
bibliography for 291
horizontal 255
vertical 255
house, picking in 482
houses 483, 485, 991, 995, 998, 1000, 1109
powders, effect of water on. A. S. Cushman .. 1419
riffles 721
Rocker 723
Rocking stone mill 1084
table 320, 1032
Rocky Mountain mill ..... xxix, 1048
Rodda, J. T., new form of stamp 228
Roebling 1195
Roebling's gauge 1194
screen gauge 173
Rogers, A. N. 787
Colorado *versus* California system of milling . 1174
data concerning slime tanks 1408
gravity stamps 224, 226
Rogers' dewatering screen 1591
at Mill 144 1592
jig 642
Rohrmühle 293
Rolker, C. M., Allouez mill, Lake Superior 1174
Ball stamp 142
Collom jig at Lake Superior 640
concentration at Glasdir, Wales 1183
cross pieces on jigs 551
Evans slime table and kieve 728
hog-trough classifier 476
mill capacity 1109
milling in Utah 1174
Rolled saw plates at Mill 180, life of 1902
steel for wearing parts of rolls 1243
Roller feeder 854
mills 1303
Griffin 282
Huntington centrifugal 276
Kent mill 1303
number used 231
table of details of Kent mill 1304
Wild mill 1304
table of sizes, capacities, power, weight, etc. 1304
quartz mills, Bryan 271
shells for Huntington mill 280
Rollers for belt conveyors 859
on vanners 646
Roll jaw breaker, Sturtevant 32
Blake breakers, Sturtevant 1205
crushing. R. K. Humphrey 2010
L. H. Sturtevant 2010
shells 66
at Mill 129 1716
cost of 69
flanges on 70
materials for 68
of chilled steel 2011
truing of 69
device, Sturtevant 1243
Roll shells, truing with emery wheel 1243
wear of 69
tires 65, 66
Rolls 62
action of on ores 62
Allis-Chalmers 1244
Reliance 82
an article on 2010
angle of nip for 89, 109, 110, 1226
Argall rolls 1230
as regrinding machine 1332, 1333
at mills 1244, 1667, 1685, 1686, 1688, 1689, 1690, 1691, 1693, 1701, 1707, 1710, 1716, 1720, 1724, 1737, 1738, 1742, 1743, 1749, 1750, 1751, 1752, 1760, 1761, 1762, 1766, 1767, 1771, 1772, 1773, 1792, 1793, 1803, 1806, 1807, 1808, 1819, 1822, 1824, 1825, 1828, 1829, 1832, 1833, 1837, 1838, 1843, 1844, 1853, 1854, 1857, 1859, 1864, 1865, 1866, 1867, 1868, 1869, 1877, 1878, 1883, 1890, 1910, 1913, 1928, 1929, 1930
auxiliary spring 80
babbitting 73
Becket Foundry & Machine Co. 76
belted 75
and geared 79
beveled 71
bibliography for 109
Birmingham Iron Foundry 76
Bowers 111
boxes or bearings for 72
Buchanan 72
capacity of 64, 100, 106, 1226, 2010
speed, power, wear, etc. 109
Chicago Iron Works 76
choke and free crushing by 98
classification of 62
coarse and fine. C. Blömeke 2010
Colorado Iron Works 76
compared with stamps 109
Sturtevant mills 110
comparison between free and choke fed rolls .. 1229
convex and concave 111
core of 65
corrugated 106, 110
rolls and rolls with inserted teeth 1242
table of sizes, capacities, and power 1243
cost of crushing by 104
repairs on 104
Davis 111
diagram of percentage reduction in 122
diameter of 83
different types of 2010
discussion of 2010
driving mechanism 75
Eagle Foundry Co. 76
Eckart 111
Edison's 110, 111
corrugated 106
giant 105
three high 107
effect of ores on angle of nip 94
efficiency of 109
E. P. Allis Co. 72, 76
features and faults of 1229
feed to 63, 1224
feeders for 71
feeding of 70
fines produced by 308
finger geared 77, 78
F. M. Davis Iron Works Co. 72
formula for angle of nip 93
for removal of vanner concentrates 647
vanners 652, 653
Fort Scott Foundry & Machine Co. 76, 111
frames of 63
Fraser & Chalmers 76
geared 78
Fulton Iron Works 76
Gates Economic 81
Iron Works 73, 79
geared 75
and belted compared 83
general construction 63
Geyer 70, 111
graded crushing by 103
G. V. Cresson Co. 72
Hendy & Meyer 76
hexagonal cores 109
high-speed 88
sizing test of pulp from 1317

Rolls, high-speed *versus* Bryan mills 1309
hoppers and housing 83
horse-power of 64
Humboldt high-speed rolls 1241
Humphrey rolls 1234
table of sizes, power, speeds, weights, etc. . 1235
in stamp mill 1017
journal friction 95
J. W. Jackson's 72, 76, 111
kept true 70
Krom belted 82
Gates, and other makes 109, 110, 111, 112
Krupp high speed 1238
lever and weight 73
made by Power and Mining Machinery Company 1245
material for wearing parts of 1243
materials cost, wear, etc. 66
McFarlane 72 76, 1232
McLanahan and Stone single-roll crusher 1241
method of cleaning 2011
M. Hoagland Sons Co. 77
Milburn's crusher 111
Montana Iron Works 76
Neuerbergs 110
Odell's 111
on native copper ore 990
periphery speed and revolu ions 88
pillow blocks and alignment 71
for 80
Pittsburg Foundry & Machine Co. 76
power and wear 108
for 95, 106
pressure exerted by 311
of 108
on 73
principle and purpose of 62
of roll crushing 1224
products crushed by 63
proper amount of reduction 92
quality of crushing by 98
ram for 112
ratio of feed to space 90
reduction 1226
relation of diameter, feed, space, and angle of nip 92
speed to angle of nip 94
trommel hole to roll space 95
Reliance 111
ribbon theory of capacity 101
rigid 112, 1235
Roger's 74, 110, 111
running at different speeds 88
Schellenbach Sons 76
Schwarzmann's 109, 110
scrapers for 75
sectional 81
shaft, journal speed, etc. 76
shafts 65
shims for 74
side adjustment 71
size of feed 90
speed, capacity, etc. 107
sizes of 64
speeds, etc. 72
treated by 63
weights, and speeds 79
sizing tests on 99, 315
test on pulp of coarse and fine rolls at Mill 162 ..... 1328, 1329
spaces between 64, 89
special forms 104
speed of 64, 86
rolls and speed curves 1224
spring pressures on 72
affecting friction 96
springs or weights for 73
S. R. Krom's 72, 77
Sturtevant balanced rolls 1232
table of sizes, power, weight, dimensions, etc. 1234
centrifugal rolls 74, 1237
Superior crushing rolls 1231
table of data from the mills 64
value of forces acting at different angles 94
tests on work required for rolls 306
Thum's compound 110
toothed 1243, 2010
table of sizes, capacities, and power 1243
Triplex rolls 1239
Rolls, Tuttle Manufacturing & Supply Co. 76
types of 75
Union Iron Works 72, 111
use of for brittle ores 314
used in brick manufacture 2011
velocity of approach in 314
versus ball mills at Mill 159 1830
Chili mills for clays 2010
disintegrators 298
gravity stamps 222
grinders 110
Heberli mill 258
Huntington mills 110
stamps 224, 314
steam stamps 110
at Mill 179 1900
Sturtevant mill 111
Vezin, made by Colorado Iron Works 84
Walburn-Swenson Co. 76
Wall's corrugated finger gear 111
W. F. Mosser & Co. 76
width of 83
Wilds 72
with flanges 110
fluted surfaces 109
knobs 106
teeth 111, 112
sluggers and knobs 104
without springs 74
Rompf jig screen. C. Blömeke 2021
Roofs for mills 1088
Root rotary pump 982, 989
W. A., the Macquisten flotation process 2030
Rope convevors, picking on 489
drive for sand wheels 866
tramway 937
transmission 1094
Ropes, L. S., mill of Isel Corundum Company, Georgia 1183
Rosales, Henry, auriferous quartz in Victoria 1176
gravity stamps 224
Rose, T. K. 787
amalgamating pans 290
amalgamators 787
arrastra 290
Blake and Schranz breakers, Dodge and Gates breakers 56
clean-up pan 291
Crawford mill 295
Cyclops mill 294
gold from placer and vein rock 1174
gravity stamps 223
Harz jigs 639
Huntington mills 297
Husband pneumatic and Patterson elephant spring stamps 143
Jordan's centrifugal grinder 295
Krom jig and Clarkson-Stanfield machine ... 837
rolls 109
large steam stamps 142
lime for slime settling 1419
metallurgy of gold xx
pointed boxes 476
retorts 783
riddles *versus* trommels 385
size of stamp feed 207
Roseberry, B. C., concentration at. A. W. Dyer .. 2043
Rosenlecher, R., dressing quicksilver in Tuscany ... 1177
Roskelly, I., stamp mill construction 2048
Ross, J., Jr., Wildman and Hector gold stamp mills 1184
Rossland district, B. C., milling in the. R. Hookes 2046
Rotary breaker at Mill 186 1917
drier at Mill 186 1917
percussion table, Bartsch 1497
pumps 871
Rotation of gravity stamps 194
Rothwell, John E., belt elevators 884
rolls for chlorination process 111
R. P., Blake breaker 57
in Ontario mill 57
Linkenbach tables 728
Ontario, Silver Reef, and California silver mines in Nevada 1174
Rotter, Max viii
Rough-crushing department at Mill 152 1805
Roughing jig 894
jigs at Mill 148 1792
plane, definition of 1465
Roughness, effect of, in launders 877
Rough, unplaned pine board surfaces used as plates 750

Roulette ball mill. C. Blömeke 2016
Round convex buddles 704, 706
holes compared with slotted holes in screens ... 169
tables, adjustments of 2023
at mills 1846, 1904, 1905, 1908
continuous surface 1506
Routine of managing heads and concaves on spindle breakers 47
Rowand incline screen 1345
at mills 1345, 1762, 1763, 1764, 1805, 1806, 1808, 1809, 1810, 1811
magnetic separator 807
at mills 1763, 1808, 1810
tower drier at Mill 152 ..... 1807, 1813
type gravity screen at Mill 138 1746
vertical drier at Mill 141 1765
Royal breaker 58
Con. Mines Co., California, the mill of the. H. F. Brown 2044
Rubber belt conveyors 859
for elevators 862
vanners 647
belting in launders 873
belts 1094
tables 698
cushion for steam stamps 116, 127
for amalgamated plates 754, 758, 760
riffle cleats 1487
roll springs 73
sheet for mortar blocks 148
surface for slime tables 695
table deck of Woodbury table 1495
versus canvas for vanner belts 650
Rubidium, atomic weight of 1188
Ruby coal breaker, Colo., practice at the. R. M. Hosea 2051
washing 2025
Rudorf, theory of flotation processes 1555, 1556
Rul, M., arrastra at Guanaxuato, Mexico 290
edge runners 295
Rules for belting 1093
jigging 631
mechanical sampler 846
power consumed in mills 1093
used in crushing 309
sampling 848, 849, 850
Running cost of spindle and jaw breakers 54
jigs, labor for 604
methods of 551
sample 843, 845
stamps 206, 223, 224
Runs 447, 476, 1082
Russell process 1175
Russia iron for jig screens 545
screen gauge 173, 1195
Rusty gold 786, 1014
catching of 776
in dredging 1012
Ruthenium, atomic weight of 1188
Rutile separated by magnets 790
specific gravity of 1189
Rutter breaker 45
Ruttman, F. S. 1175
Blake multiple jaw plant 57
breakers 57
Conkling jig 640
Ryerson pulverizer 236
bibliography for 299

S

Sachs, C., Neuhof mills at Beuthen 1186
Sacks for concentrates 1112, 1113
Safety devices for steam stamps 127
Sahlin, A., Alsing cylinder 294
breakers 57
breaking point for jaw breakers 49
buhrstone mill 253
Conkling, Buchanan, Edison, Wenström, Ball-Norton, Hoffman, Lovett-Finney, and Chase separators 835
Cyclone pulverizer 298
Griffin roller mill 297
grist mill or buhrstone mill 291
Lovett-Finney separator at Weldon, New Jersey 835
machines in Gouverneur district, New York . 57
magnetic concentrates 1180
roll speeds 87
rolls *versus* Sturtevant mills for iron ore 110
Sahlin, A. Sturtevant mill 288
mills *versus* rolls 298
sizing test on roll product 100
Saint Andreasburg, sieve scale at 367
David's Gold mine, New South Wales, milling at the. L. H. L. Huddart 2046
Dennis, Cornwall, tin dressing at 1184
Eugene mill, B. C., milling at the. R. Stokes 2040
Goar on the Rhine, mill at 1102, 1135
Johns River, Florida, pumps on 870
Joseph Lead Company mill ..... xxvi, 924, 1175
Hoffmann mill 1706
Just, Penzance, mill at 1082
Laurent-le-Minier, mill at 1179
Louis colliery, air blast at 837
exposition, the concentration plant of the ... 2047
floor of the Anzin Co., air blast at 817
Smelting and Refining Company mill 1709, 1089
Symphorien, Belgium, phosphate plant at 899
Sala, stroke of jigs at 594
Salamander crucibles for melting 784
Sal ammoniac used on amalgamated plates 749
Salberget, concentration plant at. G. Fagerberg ... 2040
Salivation by mercury 730
Salkinson, A., use of steam for settling slimes 2020
Salt used in plate amalgamaton 752
settling test 1147
water 1106
effect of in concentration 3
Salts, effect on amalgamation 767
Salzburg tables 682, 1115, 1185
versus jigs 641
Samarium, atomic weight of 1188
Sample, dipper or bucket 845
grab 845
grinders 232, 257, 292, 1284
bibliography for 292
F. W. Braun Company 1284, 1323
Nevada 1284
Sturtevant 1284
Samplers 843, 1570
are inaccurate, pipe and single split 2032
at mills 1691, 1750, 1868, 1873, 1874
Keewatin, Ontario. F. T. Snyder 2031
Smuggler Union mill, an automatic. S. I. Hallett 2032
Bridgman 884
Brunton 847, 1527
oscillating mechanical 1575
Byrne automatic pulp 2031
cheese-scoop 844
Clarkson 884
Collom 847
different types 2032
essentials of 846
for tailings at Mill 160 1834
hand sampling 1570
inaccuracies of the old Brunton 2032
in the mills 848
Johnson 2031
Lamb automatic tailings sampler 1573
mechanical 1571
pipe 845
Snyder 846, 1572
Taylor and Brunton horizontal riffle sampler... 1577
riffle 1578
Vezin 846, 1572
weaknesses of the Bridgman 2032
Samples moisture 846
storing samples 1578
weight of samples taken in mechanical sampling.. 1575, 1576
Sampling 843
a jig bed 1171
and analyzing of slimes. L. Ehrmann 2032
at mills 1730, 1734, 1912
Park City, Utah 2032
bibliography for 884
bucking the sample 1578
by coning and quartering 1577
fractional selection 1570
hand 844, 1570
Jones sampler 1570
machines, principles of 1574
mechanical means 1570
riffles 1570
shovel 1570
split-shovel 1570
cabinet used at the Sweeny mill 1570

Sampling, cleaning mill between lots 1577
cutting down crushed ore from sample rolls.... 1577
ground pulp 1578
department at mills 1667, 1691, 1742, 1884
difficulties attending mechanical 1575
general article on 2033
high-grade telluride gold ores with Vezin sampler..... 1573
in Colorado 1244
limit of error in 1575
mechanical sampling 1577
mechanical 846
methods at Broken Hill. H. W. Moss 2031
mill.....1051, 1069
S. H. Pearce 2032
minimizing effect of air currents 1576
moisture samples 1575
notes on 2032
of bullion 784
concentrating and slime tables. J. C. Bailor 2032
mill work 1168
ores. P. Argall 1609
plant of mills 1629, 1831, 1872
precautions in 845
principles of 849
requisites to accuracy 1575
rules for 848
S. H. Pearce 2031
size of samples.....1575, 1576
tower at Mill 120 1681
trough for slime table 1172
Sampson mine, sieve scale at..... 367
Samson breakers 1202, 1223
at Dives-Pelican mine 1203
Mill 113 1659
Manufacturing Company. Samson breaker 1223
San Antonio de Yguana mill 1180
Sanborn, J. A., amalgam 767
temperature of water for amalgamation 789
Sand and slime concentrators 644
concentrators..... 1464
Wilfley table 1465
corundum 1078
distributor, Blaisdell centrifugal 1602
flow of, in launders 873
for bedding false bottoms in mortar 180
heated for sweating plates 759
in launders, flow of. F. K. Blue 1609
movement of coarse. T. T. Read 2031
Sandpaper used in scouring copper plates..... 753
Sand, preparation of moulding. J. Kraus 2030
pumps 868, 1587
at Mill 182 .....1910, 1911
Standard Consolidated mine 1588
Frenier 871
and Le Blanc 2031
ratio to water in pumping 869
Sands in classifiers and jigs, action of. G. G. Bring 2020
mechanical settling and filtering of..... 2021
moisture in 1107
transported by water 878
treatment at Mill 117 1670
used for scouring copper plates..... 753
washing in New Jersey, glass 2029
weight of 1190
wheels 864, 1586
at mills... 1587, 1668, 1669, 1677, 1715, 1893, 1894
Calumet and Hecla 2032
details of 866
in the Transvaal 2031
mechanical efficiency of 1587
on the Rand 1644
versus pumps in Witwatersrand 1645
Wilfley middlings elevator 1468
San Dimas, arrastras at 238, 290
Sandstone, angle of nip required to crush 94
compressive strength of..... 300
weight of 1190
Sandycroft standard cams 215
San Francisco, cost of mill at 1126
Juan District, Colorado, cost of producing gold in 1978, 1979, 1980
wage-scale 1980
at Mill 100 1626
Martin mill, Chihuahua, Mexico. K. Thomas. 2046
Sanna modified Ferraris screen 343
Santa Barbara, oil-concentration plant, Van Meter process at 1993
Eduwiges mill 1184
Sapphire, North Carolina, corundum dressing at.... 1184
Sapphire washing 1081
Sardinia, ore dressing in. N. Pellati..... 2035
Satelin, J. de, Hughes Daviot electromagnet 834
Saucon mine, movable sieve jig at 506
Sauer-Mayer riddle 342
Sautter magnetic separator 798
Sauvage, E., Plumb jig..... 641
Saving by canvas plant 1017
new scheme in Mill 66 1026
from scrap 1115
in mills..... 1114
gold mills 1110
use of electricity 1091
of water 1104
Savings, average extractions in various districts, table of..... 1612
Saw blade for scraping plates 759
Sawyer canvas elevator belt at Mill 125 1700
Saxon mill, mercury traps in 774
wells in 770
shoes and dies 181
Saxony, cobbing in 480
mills in..... 1176
Scaife trough washer.....320, 335
Scales for weighing ore 883
sieve 1361
in American mills, table of..... 1361
weighing devices..... 1603
Scandium, atomic weight of..... 1188
Schaefer, J. V., coal washing at Alexandria Coal Company's plant, Greensburg, Pennsylvania 1178
Schamberger, J. W., clay washing 1186
Schedules for calculating the value of zinc ores 1932
Joplin zinc ores 1939
western zinc ores 1933
zinc ores, foreign 1933
Scheelite, specific gravity of 1189
Schellenbach Sons 76
rolls 76
Schemes of mill treatment 892, 1613
Schemnitz, Hungary, settling tests at 1146
U-shaped classifier 424
Schiff, F., magnetic separators 835
Schleudermühle 236
bibliography for 299
Schleuderseparator, description of the. L. Kleritz and O. Bilharz 2025
Schmidlieing Chili mill 2017
Schmidt, F., belt tables 728
-Manderbach, Adolph, spiral sieves 385
spiral screen 363, 364, 385
Schnabel, Carl, bag rooms for zinc white 885
Handbuch xx
Huntington mill 282, 297
separation processes..... 839
silver amalgamation..... 1039
by Washoe and Reese River processes .. 1174
Scholl, G. P., modern gold milling..... 2035
Schöne tubular classifier 476
School laboratory work, a free milling gold ore. R. H. Richards and E. E. Bugbee..... 2048
Schorr battery, R. Schorr on the 1278
stay-overflow mortar 1266
Schranz breaker 56, 57, 60, 61
of Dodge type..... 31
section of 32
jig 503, 641
mill 235, 274, 292
bibliography for..... 296
products of, crushing Przibram ore..... 309
tests on work required for..... 306
table.....689, 728
Schubersatz 214
Schulenburg, hand picking at 492
picking at 487
sieve scale at 367
Schulz, Dr. and Herr Zeuner, settling tanks at Tarnowitz 479
W., Huntington mill 297
Schürmann, W. R., rolls 111
Schuttelherd, New Humboldt concentrator 1493
Schwarzmann's rolls 109, 110
Schwerin, Martin, re-grinding machines..... 1340
relative efficiency of re-grinding machines.... 1331
Scobey, J. C., economy in mill water 1419
sampler at Mill 173 1880
system of slime settling in Arizona 1411
Scoops for sampler 846
Scouring copper plate..... 752
Scow for dredging 1007, 1011

Scrap iron recovered by magnets ... 790
use of ... 1115
Scraper conveyors at Mill 114 ... 1662
Mill 126 ... 1709
for belt conveyors ... 860
hard amalgam on plates ... 757, 758
plates ... 762
rolls ... 75
slime tables ... 689, 696
Scraping conveyors ... 860
Screen analysis of Garfield Chili mill product ... 1307
and lamp chimney for sampling jig bed ... 1171
area on stamps ... 209
for dredges ... 1012
unwatering ... 724
frames ... 176
for jig ... 510
steam tamps ... 120
in gravity stamps ... 176
gauges ... 171, 172
meshes, tables of ... 1196
of hand jig ... 894
openings ... 167
measurements of ... 1362
plate, cost of ... 361
sizing limit of ... 1361
principles of ... 365, 366, 1361
Screening after decrepitation ... 829
at the Witkowitz colliery ... 2050
by trommels system of ... 364
cost of ... 360
difficu ties of ... 372
economic limit of. P. Argall ... 1366
following disintegration ... 830
hot and cold ore ... 385
separation by crushing and screening ... 1566
decrepitation and ... 1565
tests ... 1138
graphic records of. C. De Kalb ... 1340
wet ... 1138
trommel ... 335
wet *versus* dry ... 1139
Screens ... 336
See Trommels and Sieves.
action of ... 2019
aluminum bronze cloth ... 174
plate ... 174
analysis ... 2019
arrangement of holes ... 168
at Mill 158 ... 1824
Monteponi, hand ... 2018
Truesdale coal washery, shaking ... 2018
the Waihi mill, New Zealand, size of ... 2019
attachment of in trommels ... 355
balancing of shaking ... 342
bar ... 336
belt type ... 1357
bibliography for ... 384
blinding of ... 175
Borgmann & Emde ... 386
brass cloth ... 174
Briart bar ... 346
Callow belt screen ... 1358
canvas shield for ... 177
capacity of ... 341
Centripact ... 1360
choice of ... 174, 371
classified ... 336
cloth ... 170
coal. F. W. Parsons ... 2019
Columbian pulsating ... 343
comparison of ... 345
shaking and cylindrical ... 2019
copper plate ... 174
corrosion of ... 354
cost of per ton of ore crushed ... 174
Denver Engineering Works Company revolving grizzly ... 1353
designation of holes ... 172
dewatering ... 1591
different types of ... 2018
Distl-Susky screw grate ... 386
Dunlap perfect clay screen ... 1357
Edison stationary ... 341
effect of acid water ... 173
size of holes in stamping ... 210
elongated punched holes ... 370
Ferraris hand ... 1360
shaking ... 342, 1347
for box classifiers ... 433, 443
Screens for gravity stamps ... 1270
Hancock jigs, wear and tear of ... 1441
Huntington mills ... 281, 1315
at Mill 162 ... 1845
jigs ... 496, 510, 552
cost of ... 547
removing sticks, bolts, pick points, etc. ... 882
settling tanks ... 458
stamps, size of ... 221
table of details of ... 121
steam stamps ... 119
material, size, life, etc. ... 121
testing ... 1137
Tremain stamp ... 136
trommels, life, cost, etc. ... 352, 354
unwatering ... 879
jig tailings ... 587
Gates all-iron frame revolving ... 1353
gravel ... 339
grizzlies ... 336
gyrating ... 342
Harrington & King's standard plate ... 369, 370
Hicks revolving grizzly ... 385
Impact screen ... 1351
Imperial screen ... 1348
in gravity stamps ... 167
size of holes in ... 210
mills, use made of ... 889
iron cloth ... 173
plate ... 173
jig, details of ... 540
Karop ... 386
King screen ... 1356, 1360
Klein moving grizzly ... 386
life on jigs ... 546
limits of ... 368
Linkenbach's figures on ... 547
material, cost, life, etc. ... 173, 174
for ... 354, 384
jig ... 545
means of designation. P. Argall ... 1366
meshes of ... 172
mill ... 1365
amount of screening surface for given output ... 1365
cost of maintenance of ... 1365
needle gauge ... 172
proper peripheral speed for ... 1365
Newaygo separator ... 1350
numbers ... 172
Oberegger gyrating ... 386
octagonal trommels ... 1353
of corrugated type ... 226
gun-metal at Mill 185 ... 1915
plate or wire cloth ... 340
on a fixed shaft, rotary ... 2018
opening in mortars ... 167
percentage of opening in ... 369, 546
with hole in 60° and 90° rows ... 168
phosphor bronze cloth ... 174
plate ... 174
placing of ... 170
plate, for gravity stamps ... 167
Pratt ore sizer ... 1345
prevention of blinding ... 373
pulsating ... 342
relation of thickness of plates and wires to diameter of holes, in the mills ... 372
to diameter of holes in punched screens as quoted ... 372
revolving ... 346, 1353
riddles, and vibrating grizzlies ... 341
round and square holes ... 369
versus slotted holes ... 169
Rowand incline screen ... 1345
Schmidt spiral ... 363
sectional trommels ... 1353
shaking ... 342
shape and arrangement of holes ... 369
sieve scale for ... 366
sizes of needles for ... 172
sizing ... 336, 1345
slope of ... 176
speed of shaking ... 342, 345
splash board ... 177
standardization of ... 1361
laboratory. W. S. Hutchinson ... 1366, 2019
stationary ... 336, 1345
of wire cloth or plate ... 340
steel cloth ... 173
plate ... 173

Screens suited for testing 1988
submerged trommel at Mill 125 1356
table of clear punched slotted 169
thickness of 341, 371
tin bronze plate 174
plate 173
Traylor Centripact 1352
trommel, life, cost, and details of 352
Tyler 171
double crimped 354
mining wire cloth 1364
used for free-settling tests 465
in trommels 350
variations in the percentage of opening of, in the mills 371
versus classifiers 368
Vibracone separators 1352
Vibromotor 385
wear of 169, 170, 356
screening surface 1365
wire cloth, of copper, brass, phosphor-bronze, galvanized and tinned 1365
wire, for gravity stamps 170
versus plate 171
with round holes laid out in equilateral triangles 168
squares 168
W. S. Tyler Co., double crimped 370
Screw conveyors 861, 1582
at Mill 105 ..... 1636, 1637
for removing jig tailings 588
table of sizes, capacities, and speeds of 1583
tappets for stamps 188, 225
Scrubber for cleaning copper plates 752
Scrubbing of amalgamated plates 758
Seager, J. B. viii
Sealing of retorts 1519
Sea water, use of 1106
used in concentration 1182
weight of 1188
Second hand machinery, experiments with 2012
Sectional Blake breaker 20, 21
breaker of Blake type 22
guides for gravity stamps 154, 155, 1268
the Denny 1269
mortars, Traylor 1267
for gravity stamps 163
rolls 81
stamp cams 192
mill 227
trommels 1353
Denver Engineering Works Company revolving grizzly 1353
Sections in mills 1108
Seeman, L., centrifugal pumps 870, 885
classifier with helical current 478
sizing, jigging, and wet stamping 1182
Stein table 729
Segregator (classifier), G. G. Gates 418
Seitz coal loading and screening machine 2018
Selenide silver mill 1622
Selenium, atomic weight of 1188
silver ores, concentration of 1925
Self-tightening cams 193
manganese-steel mantles for McCully gyratory breakers 1213
Sell, L., ball mills 293
Sellers, William & Co., steam hammer 12
Seminole mine ore, Krom air jig on 825
Separating 5
concentrating or washing 318
Separation by adhesion 831
centrifugal force 827
crushing and screening 1566
decrepitation 830
and screening 1565
disintegration and screening 830
heavy solution 1156
magnetic concentration 790
oil 831
weathering 830
combinations of principles of 891, 1611
ease of 1117
electrostatic 1199
Huntoon's experiments on telluride gold ores ... 1566
in vanners, principle of 665
miscellaneous process of 790
of fluorspar, lead, and zinc. F. Julius 2028
galena-sphalerite ores at Broken Hill 1611
grease from diamond at Mill 188 1921
mixed sulphides. R. C. Canby 1923
Separation of molybdenite 1567
three minerals on jigs 590
principles used in 889
Separators at the Kalgoorlie mines, hydraulic 2034
Ball-Norton magnetic separator 1527
Buchanan magnetic 803
Clarkson-Stanfield centrifugal 820
classification of magnetic separators 1521
Cleveland-Knowles magnetic separator 1542
cobbing magnets 1531
Conkling dry magnetic 809
Cranberry magnet 1530
Dellvik-Gröndal 804
Ding's magnetic 1540
Edison magnetic 812
electrostatic 1549
Eriksson's electromagnetic 1529
Ferraris magnetic 799, 1525
separator, drum-type 1528
final 480
for fine materials 810
steam 1091
Forsgren's electromagnetic separator 1538
Gröndal Nos. 2. 3, 4, and 5 magnetic 1537
Heberli magnetic 799
wet 810
Hughes Daviot electromagnet 812
Humboldt magnetic 1530
International magnetic 1533
Kessler magnetic 811
Knowles' New Century magnetic 1541
Leighton magnetic 1528
magnetic with conveying belts 804
Mechernich magnetic separator 1535
Mumford and Moodie's 818
Newaygo 1360
of the primary-magnet type 1521
secondary or induced-magnet type 1533
Pape-Henneberg 818
Payne magnetic 799
Peck centrifugal 828
pneumatic 1553
Sutton, Steele & Steele dry table 1479
principles of magnetic separators 1521
Rowand magnetic 807
Siemens magnetic 803
Ullrich magnetic 1535
Vibracone 1352, 1360
Wenström magnetic 800
Wetherill magnetic 804, 1521
with the ore falling in front of magnets 812
Series arrangement of machines 1110
Serpentine, specific gravity of 1189
strength of 301
Setting up a stamp 200
Wilfley tables 1468
Settlers 777
Settling, bibliography for 475
beakers or jars 1146
box for Johnston vanner concentrates 1502
concentrates in barrels 1113
definition of free and hindered 464, 1421
dust 1099
fine slimes 1147, 1185, 1186
hindered 610, 1460
limit of 455
of fine grains 473
pits for tin ores 1083
pond in the Harz, a concrete 2020
power of minerals, effect of 64
rates in different mediums 826
ratio, defined 4
ratios 469, 471
reservoirs for 460
slimes 1160, 1178, 1184
use of chemicals for 1413
tanks 450, 1109
and pits for clay 1076
at mills 1408, 1776, 1777, 1779
Morenci, Arizona 1413
baffle board 459
Berenger and Stingls slime tank 1407
Binkley settling system 1409
calculation of 454
Callow cone 1402
capacities of, 15 feet square 455
Colorado Iron Works Company 1407
data from the mills concerning 458
details of, in the mills 458
dimensions of 453

Settling tanks for graphite ores 1075
jig concentrates 586
ore dressing, a 2020
kaolin 1077, 1149
vanner concentrates 647
Merrill cylindrical clarifying tanks 1406
large cones 1406
practical limits of settling in 455
relations of length and width to the settling .. 452
speed of current to size of grain 452
Scobey system in Arizona 1411
Sherman system 1404
slime 1419
table of details of in the mills 456
tests 1146
on fine slimes 1176
theory 476
tube 621
use made of in mills 889
of lime and alum for 458, 459
velocities, curves of 467, 473
water 1104
Setzpumpe 520, 595, 639
Setzrad 478
Severing minerals, methods of 8
or detaching 5
Sexton, F. H., the ore dressing apparatus at Dalhousie University, Halifax 2048
Seyss dynamometer for work of crushing 305
Shackelford's patent box-cleaning device 1503
Shaft drier at mills 1803, 1822
furnaces for drying 880
roasting furnace at mills 1663, 1759, 1765
Shafts, boxes or bearings for 72
for amalgamating pan 248
jigs 532
diameters of 533
rolls 65
steam stamps 128
Tremain stamp 138
trommels 351
Shafting in mills 1108
Shaking amalgamating tables at mills 1645, 1650, 1651
in South Africa 1513
feeders at mills 1691, 1837, 1868, 1869
frame for Frue vanners 645
grizzly at mills 1690, 1866
launders at mills 1693, 1694, 1761, 1811
mercury trap 774
plates 740
screens 341
at mills 1694, 1889
for dredges 1012
testing 1137
new spring for 2018
table for picking 489
Shallow-pocket hindered-settling classifiers 1384
hydraulic classifiers 389
the Richards 401
Shanks and butts of stamp shoes 181
Shannon concentrator 1931
Copper Company, the use of lime for slime settling at 1416
Shape of grains, effect of, on slime tables 694
particles, effect on free settling 464
screen holes 369
Sharpless, F. F. 121, 126
amalgamated plates 750, 767
Atlantic mill, Lake Superior 1183
Ball, Leavitt, and Allis stamps 142
stamp keys 188
steel ends of tappet keys 227
temperature of water for amalgamation 789
Sharpneck steam stamp 136, 142
Sharwood, W. J., definition of slimes 1398, 1419
Shaw mine, Huntington mill at 281
Sheaves for ropes 1095
Shells for rolls 66
net cost of 69
Shepard, F. E., tube mills at the Gold King mill, Colorado 2014
Sheppard coal jig 642, 538, 586, 643
Sherman, F. W., centrifugal roller mill 1313
classifiers at Mill 132 1729
Huntington mill 1313
improved Huntington mill at Mill 132 .. 1728, 1729
re-grinders at Mill 132 ..... 1728, 1729
separating and distributing tanks at Mill 132. 1728
settling tanks at Mill 132 ..... 1404, 1729, 1730
slimer 1506
Sherman, F. W., system of settling tanks 1404
slime treatment at Mill 132 1729
wet concentration by the Sherman system 1419
slime concentrator 2023
Shield for grease from stamp cams 194
of canvas for stamps 177
Shimer and Reifsnyder sampling 884
Shims for rolls 74
Shipping concentrates 1112
expenses 1123
Shoe and die channels in amalgamating pans 246
Shoes and dies for grinding pans, wear of 1284
life of 184, 185, 2011
of stamps, table of, wear of 182
wear in amalgamating pans 249
at mill 117 1668
false, for stamps 229
for amalgamating pans 245
gravity stamps 181
life of 1277
settlers 777
steam stamp 120
life, etc. 122
of Nordberg steam stamps 1249
put on gravity stamps 201
shanks and butts 181
Sholl pneumatic stamp 141, 143
Short head and concaves, Gates' breaker with 1208
Shot for jig beds 574
Shovel for sampling 1570
vanning 1152
Shoveler, mechanical 885, 879
Shoveling, sampling by 844
Siberia, dredging in 1009
gold milling in. L. Tovey 2038
Sickening of mercury 750, 751
Side adjustment of rolls 71
bump tables comparison with end-bump 682
plane surfaces 667
Rittinger table 667
Stein, Corning, Bilharz, and Luhrig 669
with plane surfaces 667
discharge for jigs 580
hill site for mills 1085
jerk tables, comparison of Wilfley and Rittinger 679
Bartlett table 678
Cammett tables 676
Dodd table 675
Hallett table 675
Overstrom table 679
Wilfley table 670
with riffled surfaces 670
Woodbury table 676
of amalgamating pan 244
plunger jigs 529
shake vanners 645, 1499
Frue vanner 1499
Horn rotary slime concentrator 1499
Johnston concentrator 652
Norbom concentrator 652
Tulloch concentrator 652
versus end-shake 655
Siderite. See also Iron.
angle of nip required to crush 94
calcining for magnetism 1544
separated by decrepitation 829
by magnets 790
specific gravity of 1189
Siemens & Halske magnetic separator 798
rolls 2010
magnetic separator 803, 834
Sierra Buttes mill, amalgamated plates in 748
Sieve box for jigs 524
for mill testing 1996, 1997
frames, double iron 540
for jigs 538
iron 539
hole on jigs, size of 573
scale 366, 1361
at mills 1361
for jigging 606
testing screens 1138
I. M. M. standard laboratory sieve scale 1362
scales 365, 384
in American mills, table of 1361
mills 366, 367
limits of 368
surface affecting capacity of jigs 600
wires and prices 547
Siever coal jig 641

Sieves 336
See also Screens.
and plungers, sizes of, in mills 528–529
brass wire on jigs at Mill 121 1686
drop between, on jigs 549
for hand jigs 499
three-mineral separation 590
two-mineral separation 589
length of in jigs 592
life of in jigs 546
number of, on jigs 588
skimming in jigs 576
slope of, in jigs 548
width of, in jigs 591
Sifting and decrepitation 5
Silberau mill 1087, 1136
mill at 1176, 1177
Ems 1102, 1135
sieve scale in 367
Silesia, mill in 1186
Silex liners for tube mills at Mill 143 1770
Silica crushed in Blue Bird mill 222
for melting 784
Silicon, atomic weight of 1188
Siller & Dubois ball mill 293
Sills and girders for steam stamps 114
for Nordberg steam stamps 1247
Silver Age mill ..... xxv, 915
amalgam 730, 731, 747, 1512
preparation of 754
amalgamated plates 747
apparatus used for amalgamation 731
assay for in Mill 55 304
Mill 68 303
atomic weight of 1188
combination mills 1039
-copper ores, mills for 973, 984
cost of producing 1960
Cup, British Columbia, handling of ore at the. G. Attwood 2039
fineness in bullion 785
horn, crushed in Harshaw mill 207
in Lake Superior copper 766
Islet mill 1179
stamps 226
King mill, Fleming dewatering wheel at 1590
Park City, Utah 2038
H. L. J. Warren 2036
J. H. Steele 2044
Lake mill 1046, 1092, 1771
dewatering screen at Mill 139 1751
-lead ores, crushed by Blake breaker and Chili mill 271
ores, mills for 925, 936
treated at Broken Hill by Collom jigs 515
mills 1039
settlers in 777
milling, bibliography for 1173
cost of 1134
ore, amalgamation of 1167
crushed at Geddes and Bertrand mill 100
by arrastras 238
leaching and amalgamating 1167
loss of 1117
mills for 925, 1015, 1016, 1035
pan for testing 1157
separated by oil 831
treated in amalgamating pans 348
plated amalgamated plates 179, 747
at Mill 143 1769
copper plates, coated with mercury 747
comparison of with plain copper 748
plating as a preservative for copper plates 1512
discussion of. A. Clark 2024
effect on fineness of amalgam 763
method of 754
plates coated with amalgam 750
Plume, Colorado, description of two mills at ... 2043
products of stamping 139
proportion of gold and silver on successive plates in daily and hard amalgam 763, 764
Reef mill 1174
removed by picking 486
specific gravity of native 1189
treated in mills 44, 46, 47, 48 486
used on copper plates 748
per square foot of copper plate 754
wet and dry crushing 224
"Silverton Brand" elevator belting at Mill 126 1707
Colorado, electric power at 1092
Silverton, Colorado, hammers used at 10
mill at 1046, 1050, 1052
typical mill of. W. G. Swart 2042
Mining Co., mill 1050
Simmer and Jack mill, details of stamps 221
notes on. G. O. Swart 2035
Deep Ltd. ore reduction plant of 1651
Simonds, E. H., place and value of small ore tests .. 2049
Simonnet and Chaumeis, American gold stamp milling 1178
Simple-cylinder steam stamp at Mill 179 1897
jigging mills 892
using power jigs 900
steam stamp at Mill 182 ..... 1909, 1912
Simplex ore feeder 1578
Simplicity in machines 1097
mills 1004
Simpson pulverizer 2014
Single cylinder and compound steam stamps, comparison between 1254
issue 167
roll crusher, McLanahan and Stone 1241
table of sizes, power, and weights 1241
spigot hydraulic classifier at Mill 180 1902
stage crushing 103
stamp battery, the disadvantages of the 2013
versus double discharge on stamps 209
Sintering slimes at Mill 129 1717
Siphon separator 520
at Mechernich 421, 475, 477, 478
Sites for mills 1085, 1124
Size and shape of mouth of breakers 54
of amalgamated plates 737
feed to hydraulic classifiers 389
grains affecting capacity of jigs 600
for film sizing 707
jig bed 575
holes in screens 210
stamp screens, methods of designating 172
jig sieves and plungers 528
material for roasting for magnetism 814, 815
treated by amalgamating pans 248
needles for screens 172
sieve hole on jigs 573
slime tables 684, 696
Sized feed for Wilfley tables 1473
versus classified feeds for the Wilfley table 1478
Sizers Browne hydrometric conical 409
Keedy dry-ore sizer 1555
Sizes and weights of ore for sampling 851, 852
fed to jigs, range of 606
vanners 658
Wilfley table 674
of Akron Chili mills, table of 1308
Allis-Chalmers toothed and corrugated rolls, table of 1243
Alsing tube mills, table of 1296
American Process Company driers 1598
Argall driers 1600
Austin gyratory breakers, table of 1210
Blake breakers 17, 21, 24
boxes for rolls 72
cam shafts 191
Comet breaker 41, 45, 46
crushed product from breakers 1218
diagram of 1219
Denver Engineering Works Company's Blake breakers, table of 1204
Dodge breaker 30, 31
double-cone hydraulic classifiers, table of 1381
Farrel Blake breakers, table of 1200
feed for gravity stamps 207
Ferraris ball mills, table of 1300
patent tables, table of 1490
Gates ball mills, table of 1301
breakers 38, 46
style "K" breakers, table of 1208
with short head and concaves, table of .. 1209
grizzlies 339, 340
Hathaway gyratory breakers, table of 1217
Humphrey rolls, table of 1235
Imperial screens, table of 1350
improved Huntington mills, table of 1312
iron pipe 405
Jeffrey swing hammer pulverizers, table of... 1322
Kennedy gyratory breakers, table of 1214
Kent roller mill 1304
Knowles New Century magnetic separators, table of 1542
Krupp gyratory breakers, table of 1215

Sizes of La Point flour gold separators, table of 1510
McCully breakers 44
table of 1212
McLanahan and Stone single-roll crushers, table of 1241
mortar blocks 145
new Humboldt concentrator 1494
ore hand picked 487
particles, effect on free settling 464
Pilling air hoists, table of 1609
products of mills 1116
Richards' pulsator classifier, table of 1390
jig, table of 1455
rolls 64
samples 1575, 1576
Samson breakers, table of 1203
screens 168, 169, 170
for free-settling tests 465
screw conveyors, table of 1583
shoes and dies 182, 183, 184
Stroud mills, tables of 1320, 1321
Sturtevant balanced rolls, table of 1234
Sturtevant-Dodge type breakers, table of 1205
trommel screens 352
Wild roller mills, table of 1304
Wilfley roasting furnace 1548
treated by jigs 605
kieves 726
rolls 63
slime tables 693
vanners 648
Wenström magnets 801
Sizing 384, 892
amount necessary for Hancock jig 1441
and assaying tests 1163
before amalgamation 1514
J. O. Dimmick 1520
dry jigging 822
jigging 629, 631, 1463
close 2022
sorting 891
box, the Dodge 416
by a water film on a surface 1611
screens 1611
comparison between screen and hydraulic 2019
followed by agitation 891
magnetism and by sorting 891
in mills, use made of 889
limit of screen sizing 1361
of emery 1079
principles of screen 1361
screen *versus* hydraulic. S. I. Hallett 2020
screens 336, 1345
bibliography for 384
testing of 1170
test and assays of feed and products of Huntington mills 1317
on ball mill pulp 1302
Browne hydrometric sizer 410
Bryan mill product 1310
Chili mill product 269, 271
cyanide tailings 1107
Dodge pulverizer product 262
feed and discharge of Abbé tube mill 1290
and products of Drake cone classifiers ... 1668
of Huntington mills 1316
tube mills 1290
to flotation plant at Mill 130 ..... 1721, 1724
Harz jigs at Mill 144 ..... 1772, 1773, 1774
Woodbury slime classifier at Mill 162 . 1449
Griffin mill product 284
at Mill 105 1636
Hancock jig feed and middlings 1443
Heberli mill product 259
Huntington mill product 281, 1669
mill feed at mills 1750, 1772
ore broken by hand and machine 13
product of De Kalb's classifier 1402
fine grinding system at Mill 105 1638
settling tanks at Mill 144 ..... 1776, 1777, 1779
Sherman settling tanks at Mill 132 1406
spitzkasten at Mill 144 ..... 1777, 1778
Sturtevant breaker 33
pulp from Bryan mill, high-speed rolls, and Huntington mill 1317
coarse and fine rolls at Mill 162.. 1328, 1329
grinding pans 1284
at Mill 130 ..... 1720, 1724
sand treatment at Mill 117 1671
sample grinder product 257
Sizing test on Schranz mill product 276
spigot products of Richards' vortex classifiers at Mill 144 ..... 1775, 1776, 1778
stamp mortar product at Mill 180 1905
Sturtevant mill product 288
tailings and concentrates from stamps and Lane Chili mill, comparative 1309
tailings and feed of classifier jig at Mill 120 1453
of Mill 174 1887
Tustin mill product 264
Woodbury jig tailings at Mill 162.. 1449, 1450, 1451
tests, film, on quartz and galena 707
from Mill 78 667
graphical representation of 1139
on breaker products 47
Bryan mills. F. P. Probert 1323
classifier products 461
crushed ore 303
products 307, 312
crushing machines 315
gravity stamps 210
hindered-settling products 612
jaw and spindle breakers 53
jig products 607, 608
products of Gates and McCully breakers .. 45
Richards' hydraulic classifier 406
quartz and galena, results of 719
Richards' classifier products 406
roll products 98
slimes and sands. A. S. Denny 2019
stamp and Bryan mill products 273
stamped ore 222
steam stamps 135
Tremain steam stamps 139
trommel and classifier products 1140, 1144
products 381, 382
Tustin mills and stamps 309
vanner products 664, 666
to show grinding by centrifugal pumps 870
Skewes, E., washing tin slimes from Red River, Cornwall 1182
Skidmore, W. A., breakers 60
Dodge breaker 60
two-stamp steam battery 143
Skimming launders, in Binkley settling system 1409
of hand jig 497
jigs 506, 576
versus automatic discharge on jigs 584
Skinner, H. R., elevators and conveyors on the Rand 884
Skips for ore 1057
Skirt boards for belt conveyors 859
Skylights 1100
Slag formed in melting 784
Slate picker 489
a mechanical. A. H. Roberts 2021
strength of 301, 302
weight of 1190
Sledging 480
by hand 10
hammers 56
Sliding block mechanism for jigs 533
ore feeder 855
jig, construction of 525
mechanism 534
Slime agitators, Blaisdell 1602
classifiers, classifier jig 1447
Woodbury slime classifier 1447
concentration of gold mill. W. E. Darrow 2045
concentrators 644
classification of 1464
Dimmick slime table 1507
Horn 1499
Geyer 460
vanners 1499
definition of, W. A. Prichard 1419
J. H. Collins 1419
M. P. Boss 1420
jig 518, 639
ponds, the use of a dredge for excavating. Dr. Kosmann 2039
pressed and dried 1075
settling. H. S. Nichols on 1414
E. A. H. Tays 1419
by aid of milk of lime. T. K. Rose 1419
the Sherman system 1419
H. S. Nichols 1420
M. D. Stackpole 1419
relative efficiency of heat and electrolytes 1415
tanks 1419

Slime settling tanks with steam coils at Mill 144.... 1779
theory 1149
use of chemical to promote 1413
heat to promote.....1695, 1696
tables 1114
at Clausthal 606
Mill 177 1893
bibliography for 727
capacity of 697
circular, quantity of water on 694
specific gravity of feed 693
classification of pulp for 693
slimes for 720
compared 692
with belt film tables 698
comparison of different circular 2023
construction and operation 684
convex *versus* vanners 691
cost of 691
coupled with kieve 1110
vanner 1110
Wilfley table 1110
density of pulp on 695
diameter and working radius of 697
fixed circular convex 689
for testing 1154
unwaterer 880
investigation on 707
operation of 692
revolving circular concave 692
convex 686
scrapers on 696
size of grains treated 693
slope of 694, 719, 720
speed of 696
step form 689
surface for 695
testing 1172
thickness of water film on 695
velocity of water current 719
water films on 718
for 695
work, effect of shape of grains on 694
tanks, Berenger and Stingls 1407
Colorado Iron Works Company 1407
use of steam pipes in.....1695, 1696
treatment at mills 1642, 1671
in Arizona, Scobey 1411
on the Rand 1410
use of steam for settling. A. Salkinson..... 2020
what constitutes a. W. J. Sharwood 1419
Slimers 884, 1504
Akens and Evans 1500
Bartsch rotary percussion table..... 1497
belt percussion table 1496
comparison of Woodbury and Evans slimers at Mill 162 1451
James 1491
Luhrig 1496
Sherman 1506
use of riffles on 1498
Wilfley 1504
table as 1478
Slimes and sand separation at Mill 106 1640
at Tarnowitz, control of..... 2047
A. W Warwick, on finely ground 1420
chemicals for settling. W. R. Whitney 1419
colloidal silicic acid in. W. A. Caldecott..... 1419
theory of Whitney and Ober 1419
definitions of 1394, 1397
De Kalb on 1419
department at Mill 163..... 1848
effect of heat in settling slimy water 1414
H. A. Megraw on 1419
in Cœur d'Alene, the saving of. W. C. Clark..... 2041
investigation of slimes by the United States Department of Agriculture 1400
moisture in 1107
plant at Mill 162..... 1846
question 1120
settling of 1147
roasted. P. Argall..... 1419
steel bar riffles for gold..... 2026
ultra microscope for the study of 1401
what constitutes. A. W. Warwick..... 2020
Slimy water affecting jig work 599
Slip 1149
or slime kaolin 1077
Slipping of belts 1094
Slocan, British Columbia, treatment of ores by flotation processes 1526
Slope and length of trommels 378
angles, measurement of..... 1159
table of 1191
effect of in trommels 377
of amalgamated plates 737, 745
amalgamating plates at mills 1622, 1624, 1627
in California 1619
Argall drier..... 881
belt conveyor at mills 1667, 1681, 1707, 1708, 1709, 1710, 1759, 1760, 1762, 1763, 1764, 1828, 1831, 1851, 1860, 1861, 1862, 1863, 1868, 1869, 1882, 1883
tables 698, 700
bin apron at Mill 154 1815
at mills 1624, 1631, 1633, 1661, 1663, 1709, 1727, 1743, 1756, 1760, 1761, 1762, 1763, 1802, 1803, 1805, 1831, 1833, 1897
canvas, blanket and carpet tables 703
tables 700, 701
at mills 1627, 1696, 1755, 1779
chutes 843
concentric trommel at Mill 154 1816
cylindrical drier at Mill 135..... 1735
dewatering screens at Mill 167 1858
elevators at mills 1715, 1818
Evans classifiers at Mill 161 .....1838, 1839
slime tables at Mill 177 1893
feed chute at Mill 179 1897
sole for classifiers..... 437
spitzlutte..... 423
film sizing tables 707
floors in mills 1089
Mill 161 1841
German sweeping table 703
grizzlies 339
at mills 1624, 1631, 1635, 1655, 1660, 1661, 1737, 1759, 1792, 1805, 1821, 1828, 1831, 1853, 1860, 1888, 1892, 1909, 1913
Hallett table 676
Hooper air jig..... 822
Impact screens at Mill 151 1803
jig hutches..... 523
screens 548
launders 873, 874, 877
at Mill 152 1812
Linkenbach slime table 691
ore bin bottoms 842
picking belts at mills.....1806, 1882
Pierce amalgamators 1517
plates 179
revolving driers at Mill 138 1746
Roberts slime table 691
Robins belt conveyors at mills....1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1821, 1824, 1825, 1826, 1876
rotary driers at Mill 186..... 1917
round tables at Mill 180 .....1904, 1905
Salzburg table..... 683
scraping conveyors at mills 1662, 1709
screens 176
at Mill 158 1824
shaking feeders at mills 1837, 1868, 1869
grizzlies at Mill 170..... 1866
launders at Mill 152 1811
screens at Mill 111 1655
sides of *spitzkasten* 440
slime tables.....684, 694, 719
sluices..... 723
splash plates 739
Stein, Bilharz, and Luhrig tables 670
tables in film sizing tests 707, 718, 719
on dredges 1012
tower screen plates at Mill 158....1822, 1824, 1825
trays on Sherman slimer..... 1506
trommel conveyors at Mill 125 1700
trommels 347, 349
at mills ..1655,1681, 162'8 1685, 1690, 1691, 1692, 1693, 1701, 1702, 1703, 1710, 1714, 1724, 1725, 1737, 1742, 1743, 1749, 1750, 1751, 1752, 1792, 1818, 1828, 1829, 1832, 1837, 1838, 1842, 1843, 1846, 1853, 1854, 1855, 1857, 1869, 1876, 1877, 1882, 1888, 1898, 1913
undercurrents 726
vanners 648, 653, 654, 659, 660
table of, in degrees and inches 1191
Wilfley slimer trays 1506
Slotted holes compared with round holes in screens 169
Sludge 901

Sludge from hand jigs 498
mill 902
practice of Missouri-Kansas district 2043
tank, Ramsey 446
Sluggers, rolls with 104
Sluice, new Australian shaking 2029
plates 740
article on 2012
riffles 1464
Sluices, Bowie's figures on sizes and carrying power of 723
for corundum ore 1078
riffles 723
on dredges 1007, 1008, 1012
undercurrents 726
Small steam stamps 136
Smaltite, specific gravity of 1189
Smartsville and Mooney Flat, arrastra at 238, 290
Smelting compared with concentration 1
Smith, F. C., stamping, amalgamating, and concentrating telluride ore 1175
O., gravity stamps 223
gauges for wire and plate 1174
R. G., settling fine slimes 1185
Vaile filter press at Mill 101 1628
Smithsonite and limonite separated by roasting and magnetism 814
specific gravity of 1189
Smittem 894, 901
Smooth belts for Frue vanners at mills 1704, 1868, 1870
Johnston vanners at Mill 167 ..... 1858, 1859
Smuggler Mining Company 1700
mill ..... xxvi, 933
Union mill, Telluride, Colorado 1176, 2043
Mining Co., mill 1016
Smyth mill, stamps at 228
Smyth's formula 1944
Snake River, Caribou riffle on 1509
dredges on 1009
Idaho, dredging on 1013, 1181
hydraulicking on 1006
use of C. A. La Point gold separator on 1510
Snyder, F. T., amalgamating plates 741
discussion of costs, micrometer gauge for ore grains 1178
gyrating amalgamated plates 788
vanner 728, 2022
importance of mill constants for the engineer 2048
magnetic separation 1568
measurement of screen openings 1362
metallurgical standards 2019
micrometer gauge 1138
mortar at Newton mill, Colorado 227
sampler 884
shoes and dies 181
Snyder micrometer caliper 1362, 1366
magnetic separator. F. T. Snyder 2027
sampler 846, 1572
at mills 1667, 1832
vanner 657
Soap for belts 1094
Soapstone for lubricating 1097
Societé Minière du Gard, Ferraris ball mill at 1300
Sockets in stamp bosses 187
Soda for melting 784
Sodium amalgam 730, 1156
for brightening mercury 785
used in stamp mills 752
atomic weight of 1188
phosphate for brightening mercury 785
Soft rock phosphate 895
Solution for silver plating 755
Sondericker, J. viii
Sorted products obtained by air 819
Sorting 892
before sizing 891
belts at Mill 137 1438
Robins sorting belt 1438
by free settling 1611
hand 1435
breaking for 1435
picking tables or belts for 1435
hindered settling 1611
settling in air 1611
columns, area of 403
defined 387
for Richards' classifier 429
cost of hand sorting 1438
followed by agitation 891
suction 891
Sorting in small mills, hand. A. W. Warwick 2032
tables, Allis-Chalmers annular picking or sorting table 1435
and belts, speed and capacity of 1438
at mills 1617, 1892
Humboldt picking table 1437
Krupp picking tables 1435
tube, Bardwell 1988
investigation of free settling 465
discussion of results of 467
results, fastest grains 466
slowest grains 466
specific gravities of minerals used for tests 465
use made of in mills 889
Source of water 1105
South Africa, diamond washing in 333, 1178
gold mills 1149
hand picking in 482
jig beds in 574
mills in 1173, 1179, 1185
picking tables in 491
screen meshes 172
stamp practice 221
stamps in 225
use of lime for settling 459
weight of quartz in 1185
Carolina, phosphate dressing in 1183
washing in 1180
Clunes, false bottoms in mortar 180
stamp dies 179
United mill, mercury wells in 768, 769
plates in 744
splash board 177
Spring Hill mine, false bottoms in mortars 180
Southwest Missouri, clearance of plunger in blende jigs in 530
connecting rods in blende jigs in 530
shafts in Cooley jig in 532
Space between rolls 64, 89
cost of 1126
Spaced rolls, product of, crushing Przibram ore 308
Spadone concentrator belt, the 1503
Spain, iron ore dressing in 1176
Spalling, definition of 480
hammers 11, 55, 56
Span of wire rope 1095
Sparre circular oscillating table 691
J. von xx
criticism of Rittinger's theory 476, 639
slime tables 728
surface sizing 729
Spathic iron ore roasted for magnetism 814, 815
separation at Allevard 9, 492
Special forms of rolls 104
Specific gravity affecting momentum 4
separation 889
changed by roasting 828
definition of 3
difference in for jigging 609
effect on cost of milling 1128
free settling 464
slime tables 693
of copper 3
jig beds 574
mercury 730
minerals and metals 1188
effect of 3
ocean water 3
oils 1098
quartz 3
rock affecting power consumption 313
sea water 1106
settling power 4
test 1159
Specimen stamp 1111
Speed. See also each machine.
and capacity of picking tables and belts 1438
height of drop, limits of, due to mortar power 218, 215
kept constant 1092
of Abbé tube mills at mills 1626, 1677
Akron Chili mills, table of 1308
Allis-Chalmers rolls at Mill 179 1898
suspended frame vanner 1503
vanners at Mill 136 1739
Alsing cylinder 267
amalgamating pan 243, 249
American Blower Company fans at Mill 151 1804
Argall drier 881
arrastra 238, 239

Speed of Atwood amalgamator 776
Austin gyratory breakers, table of 1210
ball mill 260
at Mill 159 1828
Ball-Norton magnet 798
Bartlett shaking picking table 489
belt conveyors at mills 1667, 1670, 1690, 1691, 1707, 1708, 1709, 1710, 1759, 1760, 1762, 1763, 1764, 1771, 1772, 1819, 1828, 1831, 1853, 1868, 1869, 1882, 1883, 1913
of Wetherill magnetic separator 1523
percussion tables 1496
tables 698, 700
belts 1093
of Frue vanners at Mill 127 ..... 1711, 1712
Bilharz jig 504, 518
Blake breakers 17, 21, 24
at Mill 139 1749
Bogardus mill 260
Bradford jig 503
Brink & Hübner disintegrator 286
Bryan mill 272
mills at Mill 173 ..... 1879, 1928
Buchanan magnetic separator 803
bucket conveyor 861
buckets on dredge 1008
Butters' centrifugal pumps at mills 1671, 1672, 1674, 1677
Byron Jackson centrifugal pumps at mills 1662, 1673
Callow screens at mills 1661, 1662, 1687
Card tables at mills 1660, 1770, 1830
centrifugal pumps 869, 870
at mills 1694, 1695, 1711, 1712, 1890, 1899, 1904, 1905
Chalmers & Williams vanners at Mill 122 1687
Chili mill 269, 270
mills at mills 1767, 1893, 1898
cleaner jigs at Mill 148 1793
clean-up barrels 265
at Mill 111 1656
pans 252
Cole shovel-wheel at Mill 124 1693
Comet breaker 41, 46
concentric trommels at Mill 154 1816
cone mill 256
Conkling jig 503
conveying and draining belts at Mill 130 1721
picking belts at Mill 139 1749
conveyors 861
Crane log washer at Mill 95 1617
Crickboom wash trommel 331
Cummings granulating mill 255
Cyclone pulverizer 288
cylindrical driers 880
De Laval cream separator 827
Denver Engineering Works Company's Blake breakers, table of 1204
dewatering wheels at Mill 144 ..... 1772, 1773
disc conveyors 1583
Dodge breaker 30
pulverizer 262
dredges 1009
elevators 862, 863
at mills 1667, 1681, 1685, 1689, 1690, 1691, 1693, 1701, 1702, 1703, 1707, 1710, 1711, 1725, 1727, 1728, 1729, 1742, 1743, 1749, 1750, 1752, 1753, 1755, 1759, 1760, 1761, 1762, 1763, 1771, 1772, 1774, 1792, 1793, 1804, 1822, 1824, 1825, 1829, 1837, 1838, 1839, 1840, 1842, 1843, 1844, 1845, 1846, 1847, 1853, 1854, 1855, 1857, 1858, 1866, 1867, 1869, 1871, 1877, 1880, 1883, 1888, 1889, 1890, 1898, 1910, 1928
Ellenbecker table 681
Evans jigs at mills 1837, 1838, 1843, 1844, 1845, 1930
round tables at Mill 162 1846
slime tables at Mill 177 1893
Fans at Mill 186 ..... 1917, 1918
Farrel Blake breakers, table of 1200
feeders at Mill 125 1700
Ferraris magnetic separator 799
Frayer centrifugal pumps at Mill 159 1829
Frenier sand pumps at mills 1708, 1769, 1812
spiral sand pump 871
Frue vanners at mills 1625, 1627, 1662, 1689, 1694, 1695, 1711, 1712, 1844, 1865, 1868, 1870, 1029
Garland disc conveyors at Mill 124 1695
Gates breaker 38, 46
Speed of Gates breakers at mills 1706, 1821
style "K" breakers, table of 1208
Gebrüder Sulzer centrifugal pump at Mill 118 1678
Gilpin County bumping table 681, 682
Golden Gate table 681
Gould centrifugal pumps at Mill 139 1757
grease tables at Mill 188 1921
Griffin centrifugal stamp mill 269
mills at Mill 105 1636
grinding pans at Mill 130 1720
Gröndal magnetic separators at Mill 159 1828
Hallett table 676
Hancock jigs at mills 1710, 1846, 1869, 1930
hand jigs 499
Harz jigs at mills 1692, 1693, 1694, 1701, 1702, 1703, 1725, 1728, 1744, 1750, 1751, 1752, 1753, 1767, 1772, 1773, 1774, 1775, 1829, 1837, 1854, 1855, 1877, 1878, 1879, 1885, 1913
Hathaway gyratory breakers, table of 1217
Heberli mill 257
Hendy concentrator 683
Hodge and Cleaves sand pumps at Mill 182 .. 1910, 1911
jigs at mills ... 1902, 1903, 1904, 1905, 1909, 1910, 1911
Hooper air jig 822
Humphrey rolls, table of 1235
Huntington mill 278, 279
at mills 1669, 1684, 1686, 1689, 1694, 1701, 1711, 1738, 1753, 1839, 1845, 1867, 1869
Imlay table 681
Impact screens at Mill 151 1803
improved Huntington mills, table of 1312
International separators at Mill 138 .... 1746, 1747, 1748
Jeffrey conveyors at Mill 126 1706
jigs 518, 532, 553, 592
at mills .. 1685, 1686, 1707, 1708, 1737, 1738, 1832, 1833, 1858, 1929
Johnston vanners 1503
at Mill 167 1858
Kennedy gyratory breakers, table of 1214
Kent roller mill 1304
Knowles duplex vacuum pumps at Mill 117 .. 1673
New Century magnetic separators, table of 1542
triplex pump at Mill 117 1674
Krogh centrifugal pumps at Mill 173 1929
Krom air jig 824
Krupp ball mills at Mill 128 1714
gyratory breakers, table of 1215
Linkenbach slime table 691
log washer 327
washers at Mill 154 1815
machines 1097
McCully breaker 44
gyratory breakers, table of 1212
McFarlane rolls at Mill 142 ..... 1766, 1767
magnetic separator used at Monteponi 810
May Brothers' jigs at Mill 128 1714
mechanical batea 683
Monadnock Chili mills at Mill 144 1775
mortar jigs at Mill 177 1892
movable sieve jig 500
Narod pulverizer 282
New Century jigs at Mill 141 1760
New Humboldt concentrators 1494
Overstrom tables at mills 1711, 1730, 1930
Pape-Henneberg dry separator 819
Peck centrifugal separator 828
picking belts at mills .. 1737, 1806, 1815, 1842, 1882, 1889
conveyor 490
tables 491
at Mill 152 1805
Pilling air hoists, table of 1609
plunger feeders at mills 1749, 1750, 1857
pneumatic belt concentrator 818
pumps 872
push conveyors at Mill 105 1637
revolving driers at mills 1746, 1762
Riblet aerial tramway at Mill 124 1696
Rittinger table 668
Robins belt conveyors at mills 1750, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1824, 1825, 1826, 1876
conveying and picking belts at Mill 132 ... 1727
Robinson jig 504
Rock Emery mills 255
rolls 64, 86

Speed of rolls and angle of nip 94
speed curves 1224
at mills..1667, 1685, 1688, 1690, 1691, 1693, 1701, 1707, 1710, 1714, 1716, 1720, 1724, 1727, 1737, 1738, 1742, 1743, 1749, 1750, 1751, 1752, 1760, 1761, 1762, 1771, 1773, 1792, 1803, 1806, 1807, 1808, 1819, 1822, 1824, 1825, 1828, 1829, 1832, 1833, 1837, 1838, 1843, 1844, 1851, 1857, 1858, 1864, 1865, 1866, 1867, 1868, 1869, 1883, 1890, 1910, 1911, 1913, 1928
rotary driers at Mill 186..... 1917
rotation for tube mills 1289
round tables at Mill 180 .....1904, 1905
Salzburg table..... 683
sample grinder 257
samplers..... 848
Samson breakers, table of..... 1203
sand wheels.....865, 866
at mills 1668, 1669, 1677, 1715
Sautter magnetic separator..... 798
scraping conveyor at mills 1662, 1709
screw conveyors at Mill 105 .....1636, 1637
table of 1583
settlers 777
shaking feeders at mills 1691, 1868, 1869
grizzlies at mills.....1690, 1866
launders at mills 1693, 1694, 1761
plates 741
screens 342, 345
at Mill 175 1889
Sherman re-grinders at Mill 132 .....1728, 1729
Siemens and Halske magnetic separator 798
magnetic separator..... 804
simple steam stamp at Mill 182 1909
slime tables.....684, 696
sorting tables at Mill 177 1892
stamps at mills..1618, 1620, 1621, 1624, 1626, 1632, 1640, 1658, 1661, 1668, 1677, 1769, 1915
in California 1619
steam stamps 126
Stedman disintegrator 286
Stein, Bilharz, and Luhrig tables 670
Sturtevant-Dodge type breakers, table of 1205
emery mill at Mill 186 1918
mill 288
roll jaw breaker..... 33
rotary breakers at Mill 186 1917
Sutton, Steele, and Steele dry tables at Mill 151 1803
take-off belts of Wetherill magnetic separators 1524
Traylor centrifugal pump at Mill 114 1662
jigs at Mill 170 1867
Tremain stamp..... 138
Triumph vanners at Mill 101 1627
trommel conveyor at Mill 125 1700
trommels.....347, 349, 362
at mills.....1617, 1655, 1667, 1681, 1682, 1685, 1690, 1691, 1692, 1693, 1701, 1702, 1703, 1707, 1710, 1714, 1724, 1725, 1727, 1728, 1737, 1738, 1742, 1743, 1749, 1750, 1751, 1752, 1760, 1766, 1767, 1771, 1772, 1773, 1774, 1792, 1803, 1818, 1828, 1829, 1832, 1837, 1838, 1842, 1843, 1846, 1853, 1854, 1855, 1857, 1864, 1866, 1867, 1869, 1876, 1877, 1882, 1890, 1898, 1913, 1928, 1930
effect of 519
tube mills at mills 1632, 1770
Tustin's mill 262
vanner belts..... 648
vanners 648, 653, 654, 655, 657, 658, 659
at mills.....1686, 1687, 1778, 1780, 1930
Vapart disintegrator 830
Vezin samplers at mills.....1691, 1701, 1742, 1748, 1750, 1772
vibration of Sutton, Steele, & Steele dry table 1555
Wilfley table deck 1465
Waddell Chili mills at Mill 174 1886
wash trommels 329, 332
pans 333
water current to move sand and gravel..... 878
waves and thickness of films on amalgamated plates 746
Wenström magnetic separator 802
Wetherill magnetic separator 805
Wharton magnetic cobbers at Mill 157 1819
wheel agitator 780
Wilfley slimers 1505–1506
at Mill 132 1729
tables 673, 675, 1469
at mills 1625, 1633, 1656, 1661, 1662, 1669, 1686, 1687, 1689, 1694, 1695, 1703, 1704,
Speed of Wifley tables at mills 1708, 1715 1729, 1738, 1739, 1744, 1745, 1754, 1761, 1776, 1777, 1779, 1780, 1829, 1830, 1839, 1844, 1851, 1855, 1858, 1867, 1868, 1870, 1894, 1929, 1940
Woodbury-Benedict jigs at Mill 177..... 1893
concentrators..... 1496
at Mill 117 1669
Worthington pump at Mill 175 1890
proper speeds for sand wheels of various diameters..... 1587
Traylor centrifugal pumps 1589
Sperm oil 1097
Sperry 138
E. A., amalgamated plates.....745, 762, 763
plates for Tremain steam stamps 787
mercury traps 774
Sperry vanning buddle 2022
Tremain stamp 136, 139, 142
trap in Cross mill 774
use of lye on plates 751
Sphalerite and quartz, jig tests on..... 628
extraction plant at Mill 130 1721
hindered-settling test on 617, 620
pulsion jig test on 625
settling velocity of 466, 469
specific gravity of 1189
Spider in amalgamating pan 247
Spiders for trommels 350, 352
Spigots for classifiers 388, 404, 433, 442, 444
jigs 507, 527
spitzkasten 440
Spilsbury, E. G., breakers 60
Dodge breaker 60
Engis machine 838
jig 527
riddles *versus* trommels..... 385
Spindle and jaw breakers, table of products of 53
breakers 36
capacity of..... 52
compared 45, 46
comparison with jaw 51
continuous action of 55
cost of 52
details in the mills 46
distribution of crushing in the mill..... 54
fine crushing in 54
friction 54
having greatest movement on smallest lump 36, 1207
heads and concaves 47
mill data on 46
number used 51
power of 52
principle of action 52
running cost 54
size and shape of mouth..... 54
table of comparative tests of 45
cost of crushing by 50
details of 46
sizing tests of product from 45
taper 52
wear for 46
weight of 52
with equal movement on large and small lumps..... 45
greatest movement on largest lump 45
or gyrating breakers 1206
versus jaw breakers at Mill 156 1818
Spinel, specific gravity of 1189
Spiral screen 384
the Schmidt..... 362
sand pump 870
washing pipe for slime tables 689
Spitzgerinne 441
Spitzkasten. See Pointed Boxes.
Spitzkasten 439
at mills 1777, 1778, 1878, 1879
Richards-Shepard 1401, 1419
Rittinger 433
slope, spigots, deflectors, etc. 440
Spitzlutte. See Tubular Classifier.
Spitzlutte.....476, 773, 1382
Rittinger 422, 424
Splash board 739
for stamps 177
plates 739
Splice for belt 1094
Split shovel 1570
for sampling 844
Spodumene, specific gravity of 1189
Spokes for sand wheels 865

Spots on amalgamated plates 762
Spray pipe for trommels 358
pipes on slime tables 688
vanners 647
Spring board for hand jig 496, 894
hydraulic, and pneumatic stamps 1246
pressure on rolls 72
at Mill 167 1857
stamps 139, 141
bibliography for 143
Froitzheim's 143
timbers for hand jigs 497
steam stamps 114, 118
Valley coal dressing plant. L. Gluck 2051
Springs for Bradford jig 501
rolls 73
on Collom jig 515
Sprinkler for mercury 760
Sprocket and chain 1096
for trommels 356
Square Deal mine, Wisconsin, cost of hand picking at 1439
measures, equivalents of 1187
Squeezer, power amalgam 1519
Squeezing amalgam 781, 1517
Stacker for dredges 1008, 1012
Stackpole, M. D., slime precipitating agents 1416
settlings 1419
Stack roasting furnace at Mill 138 1747
Stage crushing. J. A. Wauchope 2015
Stahl, A. W., power by wire ropes ..... xx, 1174
Stains on amalgamated plates 750, 762
See also Tarnish.
Stamp battery, definition of 145
foundation of 145
mortar block of 145
bosses, weight and dimensions 186
Dunham's spring 141
for crushing coal, an electrically driven 2013
frames 152
in the mills 158
Fraser and Chalmers 114
head 185
Boss 1271
Husband 141
Krause's pneumatic 141
mill, adjustments of the. C. De Kalb 2011
appliances, some accessory. G. A. Swart ... 2031
bolts for holding down mortar in 150
California 144
experiences. A. Del Mar 2049
experiments 2011
for testing 1137
practice. C. De Kalb 2048
notes on 2035
in South Africa 221
pulp, sizing test and analyses of 303
records. E. P. Brown 2048
tests 1165
waste, recovery of 266
with gravity stamp and canvas table 1038
wooden 2011, 2012
milling, California *versus* Colorado 1030
discussion of. D. Harmon 2012
in California, cost of. A. Del Mar 2045
of free gold ores. D. Harmenn 2047
some suggestions on 2046
mills 1013
bibliography for 1173
classifiers in 658
cost of milling 1131, 1132
cross sills in 153
description of two new 2036
feeding of water to. B. McDonald 2044
gravity, forms of frames for 156
guides in 155
timbers 155
improvements in. C. C. Christensen 2011
mud sills for 152
platforms for 156
posts for 153
using plates, vanners, and canvas or blanket tables 1029
with plates and vanners 1018
without amalgamated plates 1014
Morison's high speed 141
Patterson Elephant 141
Phœnix atmospheric 140
portable prospectors 2011
pulp consistency of 413
Rapid Economy 1261, 1278
Stamp shaft, pulley, and guides 128
shoes and dies 182
Sholl 141
stems 187
for grizzly bars 338
table of details of 187
tapers of 187
Stamping, high speed 2011
in cyanide solutions at Mill 102 1630
mills 1645, 1651, 1668, 1679
S. Africa, coarse 2012
Stamps. See Steam, Gravity, Pneumatic, Spring.
advantages of. A. Del Mar 2013
and mortars, table of weights of 164
arrangement of 1108
at the Simmer Deep, heavy 2013
capacity of 130
comparative work of gravity stamps and Huntington mills 1262
Nordberg single cylinder and compound steam stamps 1254
comparison of 134, 2012
Denny hydraulic 1257
details of steam cylinders, water used and capacity 126
die, ring, staves, and shoes for 120
discharge 129
duty of 2013
efficiency of steam and gravity compared 134
feed for 1224
floors, bins, and feeding arrangements 128
for crushing lime at Mill 106 1416
foundation, mortar beds, and sills and girders .. 114
frame of 118
gravity. See Gravity Stamps.
gravity 113, 144, 1246
at mills 1640, 1658, 1769, 1915
Boss cam key for 1273
cantilever frame for 1272
head for 1271
lever-operated finger, for 1273
wedge-grip tappet for 1272
cams for 1272
Canda cams for 1273
economic range of 1276
Foote screen for 1270
guide blocks for 1267
heavy stamps at Mill 107 1645
in South African practice 1643
Krupp cam shaft for 1272
life of shoes and dies 1277
materials for wearing parts of 1277
mortars 1263
order of drop for 1274
Pachuca stamp battery 1272
power for 1274
principle of 113
and purpose of 1262
proportions between weights of parts 1272
sectional guides for 1268
heavy 2013
at Simmer Deep 2011
hydraulic 1257
pneumatic, and spring 1246
Krause pneumatic 141
lever 1246, 1261
Rapid Economy 1261
mortar and screens for 119
Nissen, at Boston Consolidated 1278
Home Run mill 1264
Mill 165 1851
gravity 1263
Nordberg single-cylinder steam stamp 1247, 1249
stamp single-cylinder, indicator diagram. 1250, 1251
tandem-compound steam stamp at Tamarack and Osceola mills 1254
on the Rand, heavy 2012
piston, piston rod, dash pot, flange, revolving pulley, stamp stem, stamp shoe of Nordberg steam stamp 1247
pneumatic 1257
and spring 113, 139
principle of 113
See Pneumatic and Spring stamps.
steam, and gravity 224
power and efficiency of 131
principle, purpose and classification 113
ring 120
safety devices 127

Stamps, screen for 120
shaft, pulley, and guides 128
shoes 120
sizing tests on 315
small steam 136
spring 141
staves 120
steam. See Steam Stamps.
steam 113
cross-compound 1250
discharges for 1256
foundations, anvil blocks, mortar beds, sills, and girders of Nordberg steam stamp 1247
indicator diagrams of tandem or steeple-compound 1255
Krause mortar discharge for 1256
mortar jig discharge for 1256
Nordberg steeple-compound at Mill 181 1254
pneumatic and spring 113
principles of action 1246
single-cylinder at Mill 182 1254
sizing test on Butte ore crushed by 135
steam cylinder, valves, and valve gears of Nordberg steam stamps 1249
table of efficiency of 133
tandem or steeple-compound 1250
use of and quality of work of 134
table of details for screens 121
of valve action 127
foundations and mortar beds 118
sills and girders for 118
tests on work required for 306
their principle, purpose, and classification 113, 1246
Traylor gravity 1278
velocity of fall in 315
versus ball mills, as slime makers at Mill 185 1916
Bryan mill 273
Griffin mill 284
rolls 224, 314
weight of and effectiveness of blow 218
weights and duty of 2013
Wellman, Seaver, Morgan gravity 1278
Stand pipes 1106
for Tamarack classifier 397
Standard Consolidated mill 228
amalgamated plates in 766
mine, Frenier sand pumps at 1588
Iron Works, Lane slow-speed mill 1308
machines 1097
mill 1183
Idaho, milling at the. J. R. Finlay 2033
mine, tube mill lining at the ..... ~~2014~~ 2016
Bodie, Cal., slope of launder at 1549
Mining Co., mill 947
ten-stamp battery 1267
Standardization of laboratory screens. W. S. Hutchinson 1366
screens 1361
A. Whitby 2019
report of committee on 2019
Standards, metallurgical. F. T. Snyder 2019
Stanford, C. P. 228
Stanwood gravity muller 1279, 1285
Stapff, F. M., Stapff jig 642, 643
Star Canon, Nevada, Krom jig at 824
of the East mill, amalgamated plates in 745
Ballarat, acid water 173
mercury wells in 769, 771
Starch, settling of, ... 880
Starr, G. W. Empire gold stamp mill at Grass Valley 1184
Stationary picking tables 488
screens 336, 1345
for dredges 1012
Staurolite, specific gravity of 1189
Stausatz 214
Staves, details of, from mills 123
for steam stamps 120
Stay battery 224
for stamps 214
box for jigs 551
boxes for jig discharges 584
overflow mortar, Schorr 1266
Steam cylinder for steam stamps 122
of Nordberg steam stamps 1249
for heating 1098
power 1091
hammers 12
jacket for amalgamating pan 243
jig 519
Steam pipe for amalgamating pan 243
pipes for drying 882
power in mills. See Individual Mills in Chapter XX.
power for mills 1089
pressure in mills 1090
on steam stamps 126
pumps 871
separator 1091
stamp, Allis .. 114, 116, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 131, 133
area of discharge 129
Ball .. 114, 118, 119, 120, 121, 122, 123, 124, 126, 127, 128, 130, 131, 132, 133, 134
Cuyahoga .. 114, 118, 119, 121, 122, 123, 126, 127, 128, 133
Fisher's 142
Fraser & Chalmers .. 114, 116, 118, 119, 120, 121, 122, 123, 126, 127, 128, 131, 133
indicator bell 129
laboratory 2011
Leavitt .. 114, 115, 116, 118, 119, 120, 121, 122, 123, 124, 126, 127, 128, 131, 132, 133, 134
linings 120
mills in Montana 984
at Lake Superior 990
mortar discharges 993
Nordberg 997, 1247
foundations, anvil blocks, mortar beds, sills, and girders 1247
single-cylinder stamp 1249
steeple-compound at Mill 181 1254
tandem compound at Tamarack and Osceola mills 1254
prospector's 2011
screens, material, size, life, etc. 121
shaft, pulley, and guides 128
Sharpneck 136
Tremain 136
Union Iron Works .. 114, 117, 118, 119, 122, 123, 126, 127, 128
Wilson's 142, 143
Wood 136
stamps 224
action of 113
at mills 1892, 1895, 1897, 1899, 1901, 1906, 1909
bibliography for 142
capacity of 130
cards of 131
clean-up 134
comparative performance of Nordberg single-cylinder and compound stamps 1254
cost of crushing by 134
cross-compound 1250
cylinder clearance 123
dash pot on 127
die, ring, staves, and shoes 120
different makes of 2011
discharge of 129, 1256
efficiency of 131
energy, momentum, and efficiency 133
floors, bins, and feeding 128
foundation, mortar beds, sills, and girders ... 114
frame 118
history of 2011
indicator diagrams of single-cylinder Nordberg 1250, 1251
tandem or steeple-compound 1255
Krause discharge 1003, 1256
Leavitt differential cylinder 124
mortar and screens 119
housing 119, 120
jig discharge for 1256
on gold ores 135
piston, stroke, speed, water, capacity 126
piston rod, dash pot, flange, revolving pulley, stamp stem, stamp shoe 1247
power for 131
principle of 113
action 1246
rubber cushion for 116, 127
safety devices 127
screen frame 120
single-cylinder at Mill 182 1254
sizing tests 135
small 136
spring timbers for 114, 118
steam cylinder, valve, and valve motion 122
tandem or steeple-compound 1250
tests on 1261
at Mill 182 1909

Steam stamps, types of ... 114
used for malleable minerals ... 314
uses and sizing tests ... 134
valve and valve gears of Nordberg steam stamps 1249
versus gravity stamps ... 134
rolls at Mill 179 ... 1900
water used ... 129
wearing parts ... 121
weights, life, etc., of shoes, dies, rings, staves 122
used for heating water for amalgamation ... 768
versus electricity as a motive power ... 1927
Stearns-Roger Manufacturing Company, hoe conveyor at Mill 141 ... 1762
Mill 152 ... 1807
roll speeds ... 87
scraping conveyor ... 1662
Wetherill magnetic separator ... 1521
Stedman's disintegrator ... 236, 284
bibliography for ... 298
capacity for clay ... 286
fertilizers ... 286
of, at Eagle, West Virginia ... 285
Steel cloth screens ... 173
consumption of shoes and dies at Mill 117 ... 1668
for jig screens ... 545
roll shells ... 68
springs ... 73
shoes and dies ... 182, 183, 184
steam stamp wearing parts ... 122
frame for mills ... 1088
log washer ... 325
McLanahan's ... 325
plate screens ... 173
receiving bins at Mill 174 ... 1882
scraper for amalgamated plates ... 758, 762
specific gravity of ... 1189
versus brass for jig screens ... 547
Steep end-shake vanner ... 1165
Steeple-compound or tandem steam stamps ... 1250
indicator diagrams ... 1255
steam stamp at mills ... 1254, 1895, 1899, 1901
Stefan, H., Bryan mill ... 296
mill ... 1177
Stein table ... 669, 698
Steinenbruck, mill at ... 1176
Rittinger tables at ... 668
Stem for gravity stamps ... 187
guides at Mill 96 ... 1618
Stem Winder Mill ... xxvi, 951
Stems, fatigue of stamp ... 2012
of Nordberg steam stamps ... 1249
removal of broken stamp ... 2011
Stephanite, specific gravity of ... 1189
Stephen Lavagnino's arrastras ... xxviii, 1039
Stephens-Adamson Manufacturing Company, belt conveyors at Mill 171 ... 1868, 1869
elevator buckets at Mill 126 ... 1707
self-oiling carrier for conveyor belt ... 1585
tripper for discharging conveyor belts ... 1586
Vibracone separator ... 1352, 1360
Step roller crusher mill ... 2017
Steps on slime tables ... 689
Steptoe Valley Smelting and Mining Company ... 1852, 1865
Mill Ely, Nevada. W. R. Ingalls ... 2039
Sterling Iron & Zinc Co., mill ... 1060
magnetic separation ... 837
Sterrett, D. B., monazite sand dressing in the Carolinas ... 2030
Stetefeldt, C. A., gravity crushers ... 229
stamps ... 226
versus Krom rolls ... 110, 112, 224
leaching silver with hyposulphite ... 1174
lixiviation ... 1167
of silver ores ... xx
rolls ... 109, 111
Stewart jig in coal washing ... 2022
system of coal washing. D. T. Blakey ... 2051
Stewart's mill, wear of amalgamating pans ... 249
Stibnite, specific gravity of ... 1189
Stickles mill of the Utica Company ... xxviii, 1034
Sticks, removal of ... 882
Stilbite, specific gravity of ... 1189
Stiles pulverizer ... 228
Stirling boilers ... 994
Stirring arms in trough washers ... 320
in settling fine slimes ... 1148
Stirrup feeder ... 854
Stock house for ore ... 843, 1108
Stoek, H. H., concentration of Mesabi ores ... 1344
Stokes, G. G., law of viscous resistance ... 1423
Stokes, G. G., velocity of a sphere falling through a viscous liquid ... 1433
R., asbestos milling in Canada ... 2046
Britannia Copper Co. mill, B. C. ... 2046
Coniagas mill, Cobalt, Ontario ... 2046
diamond washing in Africa ... 2046
milling at Broken Hill ... 2046
Rossland district, B. C. ... 2046
St. Eugene mill, B. C. ... 2046
mill practice in Australia ... 2046
tin industry of Tasmania ... 2046
washing in the Malays ... 2046
tube milling in New Zealand ... 2014
Stolberg, jig eccentrics at ... 532
Stone, compressive strength of ... 300
effect of heat on strength ... 302
riffles ... 721
tests on at Watertown arsenal ... 300
Stoppages in mills ... 1115
Storage bins ... 843
tanks for water ... 1106
Storehouse for mill ... 1088
Storing concentrates ... 1112
Storms, W. H., California gold mills ... 1179
canvas tables ... 729
gold stamp mills in California ... 1181
Story in mill building ... 1086
Stoves for heating ... 1099
Stowlinski, F. de, concentrating mill, San Antonio de Yguana, Mexico ... 1180
Strainer for classifiers ... 388
water ... 858
Strakes ... 725
Strainer for amalgam ... 781
Strands in wire rope ... 1095
Strength of cubes and prisms, tested at Berlin ... 302
machines ... 1096
rock, effect of, on power used ... 313
stone ... 300, 315
before and after heating, tested at Berlin 302
parallel and perpendicular to bedding planes ... 302
Stresses in machines ... 1099
Stretch of belt ... 1094
Strips ... 1082
Stroh's jig ... 642
Stroke of jigs ... 553, 594
movable sieve jig ... 500
steam stamps ... 126
on Wilfley table ... 673, 675
See also Throw.
Strokes, number of, in jigs ... 592
Strontianite, specific gravity of ... 1189
Strontium, atomic weight of ... 1188
Stroud, E. H. and Company, disintegrator and pulverizer ... 1319
mill ... 1281, 1319
tables of sizes, capacities, power, etc., of the 1320, 1321
Structure and fracture of minerals ... 3
Stubbs wire gauge ... 1194
screen gauge ... 172
Studying mills, method of ... 1613
Stuff treated by pans, table of size of ... 248
Stuhl, L., Mumford and Moodie machine ... 839
Stupakoff, S. H., on wire gauges ... 2019
Sturm, Friedrich, separation processes ... 839
Sturtevant, bag houses ... 883
balanced rolls, description of ... 1232
table of sizes, power, weights, dimensions, etc. ... 1234
B. F., Co., heating apparatus ... 1099
breaker ... 1223
diagram of ... 32
for testing ... 1137
centrifugal rolls ... 2010
description of ... 1237
Dodge-type breaker ... 1205
fan at Mill 105 ... 1636
horizontal emery mill at Mill 186 ... 1918
Mill Company, rolls ... 1245
rock emery mill ... 253
sample grinders ... 1284
Sturtevant breaker ... 1223
mill ... 110, 236, 286
bibliography for ... 298
details of ... 388
versus rolls ... 111
roll jaw breaker ... 32, 36, 2009
data of sizes ... 33

Sturtevant roll jaw Blake breakers 1205
rolls 2010
at Mill 178 1896
182 1910
roll shell turning device, the 1243
rotary breaker at Mill 186 1917
sample grinder 1279, 1284
toggle separator 2018
Stutz coal jig 523
mechanism 537
improvements on coal jigs 640
jig 538
ribbon theory of roll capacity 101
S., link belt elevators and conveyors 884
rolls for coal 109
water separation 640
Style "K," Gates' breakers 1207
Submerged trommels at mills 1356, 1703, 1726
Suckling's double discharge mortar 227
Suction 889–891, 1611
and pulsion in jigging 1460
after sorting 891
Bring's tests on suction jig 1461
cleaners at Mill 186 1918
dredge 1009
effect of 628
fans, for dust 883
final conclusions on 631
general principles of 627, 1461
how avoided in jigs 538
in jigs 494, 627
Hoppe's tests 630
investigated in the mills 632
theory of 1462
use made of, in mills 889
Sudbury, breakers at 57
Suisse, Mathet, De Gournay and Hochstrate apparatus 837
Sulphide Corporation at Mill 130 1719
separated by oil 831
Sulphides, effect of, on amalgamated plates 749
Sulphur, atomic weight of 1188
from coal by crushing, removal of. C. C. Upham 2049
Mines Company mill 900, 905
Mines and Railroad Company 1116
mill 905
Virginia, mill at 905
ore, mill for 904, 905
specific gravity of 1189
Sulphurets treatment of 781
Sulphuric acid for leaching 1167
in settling tests 1147
used on plates 751, 752
Summary of devices used on revolving convex tables 689
grizzlies and gravel screens 339
principles 889
of ore dressing 1611
Summerhayes vanner belt 647
Summit County ore, Colorado, concentration of. D. H. Laurence 2043
Mining Co., results with Wilfley table 674
Superior crushing rolls, description of 1231
rolls at Mill 167 ..... 1232, 1857
Supplementary principles in concentration 5
Surface current box classifiers 433, 477, 1401
details of in the mills 442
in the mills 440
method of investigating laws of free settling particles in 434
expenses 1123
for slime tables 684, 695
of slime tables 688
produced in crushing 310
relation of to diameter of ore particle 305
sizing on, used in mills 889
tables 685
continuous 686
intermittent 700
tension, relation to slime question 1414
theory of crushing work 305
units of 1187
Suspended frame vanners, Allis-Chalmers 1503
Johnston 1501
sorting or picking table, Krupp-type 1436
Sutter Creek, California, mill at 1023, 1184
Sutton, Steele and Steele, dialectric separator 1766
at Mill 151 1804
electrostatic separator 1611
pneumatic dry tables 1479, 1554
Sutton, Steele and Steele pneumatic dry tables at mills 1765, 1803, 1804
vibrometer ore sizer at Mill 151 ..... 1803, 1804
Sutton-Steele dry table, description of the. R. C. Canby 2027
electrostatic separator, description of the 2027
process. R. C. Canby 1568
Svärto, Sweden, magnetic concentration at 835, 836
separation at 834
mill at 1185
phosphate made at 815
Swain hydraulic classifier, the 1371, 1420
Swart, W. G., a good article on electrostatic separation 2027
Sweating plates for amalgam 759
Sweden, Elmore vacuum oil process in 1560
jigs in 640
magnetic concentration in 835
mills in 911, 1175, 1179
Wenström magnets in 801
Sweeney, J. M., riffles 721, 729
Sweeny mill, sampling cabinet used at 1570
Sweeping table 703
Sweeps for buddles 705, 706
Sweetser, R. H. viii
Swinburne, theory of flotation processes 1555, 1556
Swinging conveyors at Mill 168 1862
plates 742
Switches in launders 873
Syenite, weight of 1190
Sylvanite, specific gravity of 1189
System, continuous or Boss, of working amalgamating pans 248
intermittent or tank of working amalgamating pans 248
of screening, the Heberli 364
Neuerberg 364
Systems of trommels 364

T

Table, automatic blanket. T. White 2022
Bartlett 678
Bartsch circular bumping 691
Brunton belt 698
Cammett 676
Castelnau 698
Clark 689
department at mills 1785, 1841
Dodd 675
Ellenbecker 681
Evans 689
Ferraris belt 698
for settling starch 880
testing 1153, 1154, 1155
German sweeping 703
Gilpin County bumping 680
glass, for film-sizing tests 707
Golden Gate 681
Hallett 675
Hendy concentrator 683
Imlay 681
Linkenbach slime 689
of diameters and areas of circles 2000, 2001, 2002, 2003
velocities of quartz grains 2003, 2004, 2005, 2006
effect of distance hauled upon settlement in wagon 2007
voids in crushed limestone 2006
Overstrom 679
Parsons 668
revolving circular concave slime 692
Rittinger 667
Roberts slime 691
rocking 320, 1032
Salzburg 682
Schranz 689, 728
Sparre circular oscillating 691
top, paint for 1483
Uren belt 698
with riffles 770
Wilfley 670
Woodbury 676
Tables. See also Buddles, Table, and Slime Tables.
Allis-Chalmers annular picking table 1435
and belts for hand picking 1435
speed and capacity of 1438
belt 669, 697
bibliography for 727

Tables, blanket 703, 1464, 1507
building type 704
bumping 1497
and jerking 667
canvas 700, 1035, 1464, 1507
carpet and blanket 703
carpet 703, 1035, 1464, 1507
classification of Wilfley group 1465
cocoa matting 702
concentrating, Bartlett Simplex concentrator 1487
Bartsch rotary percussion table 1497
belt-percussion table 1496
capacity of Wilfley table 1469
Card concentrator 1481
Christensen concentrator 1484
cleaned-ore plane in 1465
cleaning plane in 1465
deck of Wilfley 1467
Deister concentrators 1488
Dodd buddle 1481
elevator or raff wheel for Wilfley table 1468
feed box for Wilfley table 1468
Ferraris 1490
foundation for Wilfley table 1465
general comments on 1498
head motion for Wilfley table 1466
height of riffle cleats for Wilfley table 1468
investigation of Wilfley table work 1469
James table 1490
slimer 1491
linoleum for deck cover 1467
Luhrig-Buss concentrating table 1492
slimer 1496
McLeod concentrating table 1492
new Humboldt concentrator 1493
new Standard concentrator 1478
operating conditions for Wilfley table 1469
Overstrom table 1479, 1485
Pinder concentrator 1479
riffle cleats for Wilfley tables 1467
roughing plane in 1465
"setting up" and "leveling up" Wilfley tables 1468
sized *versus* classified feed for 1478
speeds for Wilfley table 1469
Sutton, Steele & Steele dry table 1479, 1544
tilting-frame for Wilfley table 1457
wash water for Wilfley table 1469
Wilfley 1465
table as a slimer 1478
Woodbury table 1494
continuous-surface round tables 1506
Cornish frames 704
end-bump 680, 1464
film-sizing 685, 1506
fixed circular convex slime 689
for amalgamated plates 733
dredges 1012
picking 488
greased 831
Humboldt picking 1437
intermittent surface type 700
investigation of film sizing 707
of equivalents 1187
principle of 644
concentrating. C. W. Comstock 2023
principles of action of Wilfley group 1465
revolving circular convex slime 686
strakes 725
Salzburg 1115
shaking amalgamating tables in South Africa .. 1513
side-bump 667
slime 684
Stein, Corning, Bilharz, and Luhrig 669
tye 707
versus jigs 606, 641
Wilfley group 1464
Taft breaker 61
Tailboard for jigs 510, 525, 550
height of 550
Tail-discharges for jigs 581
Tailings and sludge mills of Joplin, Missouri 2042
Tailings at Broken Hill, disposal of 2032
Kalgoorlie, disposal of 2032
the Arizona Copper Co., disposal of 2032
definition of 494
disposal of 1113
for future use, storage of. H. F. Durant 2032
handled by mechanical shoveler 879
launders 873
of vanners, testing of 1171
Tailings plant at Kellogg, Idaho 2043
for tin ores 1082
of Calumet & Hecla Mining Co., Michigan .. 2046
Mill 177 1894
preservation of 1114
removal of, from jigs 587
reservoirs 460
re-treatment plant at Mill 130 1723
sampler 848
sampling of 845
sand and slimes in the Witwatersrand, handling of. H. R. Skinner 2047
sizes of, in mills 1116
treatment of 1110, 2048
at Tintic, Utah, ... 2036
used for filling 925
value of 1114
weight of 1191
wheels 864
data on. Julian & Smart 1610
mechanical efficiency of 1609
spokeless. L. H. Lavenstein 2032
versus pumps in Witwatersrand 1645
Take-off belts of Wetherill separator, width, thickness, and proper speed 1524
Talc, angle of nip required to crush 94
effect on mercury 751
grinding mill. J. N. Nevins 2014
ground in buhrstone mill 253
specific gravity of 1189
Tallow 1097
for belts 1093
Tamarack clasifier 397
mill, Burgan classifier at 1371
Nordberg tandem-compound stamps at 1254
rigid rolls at 1237
Mining Company mill ..... xxvii, 1000, 1181
Tandem-compound steam stamps 1250
at Tamarack and Osceola mills 1254
indicator diagrams 1255
trommels 362
Tank for constant head 858
washing with hand picking 488
house at Mill 161 1840
system of working amalgamating pans 248
Tanks, Callow 2020
distributing 449
for water 1106
settling 450
Tantalum, atomic weight of 1188
Taper of breakers 52
stamp stems 187, 188
Tappan pump 1046
Tappets for gravity stamps 188
the Boss wedge-grip 1272
resetting 201
screw type 189
table of dimensions of 189
Tarasca Gold Mining Company, Pinder concentrators at 1481
Tarnishing of amalgamated plates 749
Tarnowitz, Büttgenbach's separator at 447
Heberli mill at 292
settling reservoir at 461
tanks at 479
Silesia, mill at 1186
specific gravity test at 1159
stamps at 230
Tasmania, costs of producing copper at 1957, 1958
mill in 1183
tallow for guides in 156
tin milling in 1083
mines, stamps 225
Tatum, L. W., amalgamating pans 291
Taylor and Brunton horizontal riffle sampler 1577
riffle for cutting down ground pulp 1578
F. W., belts 1093, 1094, 1176
hand breaker 59, 1137
Iron & Steel Co., manganese steel 68
J. & Co., stamp mill 1137
mine of Idlewild Gold Mining Company, mill .. xxvii
mine, mill at 1021
pipe sampler used by 845
portable stamp mill 2012
Richard, revolving knife buddle 335
W. W., sampling 884, 885
Tays, E. A. H., Bryan mill 273
comments on Binkley slime-settling system. 1410
slime settlings 1419
Teague on kieves 727

Tecolotes mill 1748
Telluride, Colorado, mill at..... 1014, 1016, 1176
milling practice at 1925
gold 1014
ore, cost of producing gold from..... 1974
tests on 1175
Tellurium, atomic weight of 1188
Temperature, effect of on amalgamation..766, 1516, 1640
at Homestake. T. J. Grier 2024
settling slimes..... 1149, 1848
straining amalgam 781
of heating for decrepitation 829
oil separation 831
pan amalgamation 248
roasting for magnetism 814
regulated by pyrometer in Wilfley roasting furnace 1548
Template for stamp cams 193
Templates 1097
Templeton roller feeder 854
for gravity stamps 199
Tenacity, affecting separation 891
and brittleness, effect of in dressing ores..... 2
Tendency of ore dressing 1119
Tennessee Copper Company, cost of producing copper at..... 1956, 1957
Tenorite, specific gravity of 1189
Tension in belts 1093
Tenth U. S. Census, order of drop of stamps 215
Tephroite, specific gravity of 1189
Terbium, atomic weight of 1188
Terraced mill site..... 1085
Terry, G., pigments, paint and painting xx
washing china clay 1174
Test, directions for carrying out a concentration. J. P. Porter..... 2048
in Platteville, Wisconsin, results of a mill. B. Hodge 2048
jigging 1165
of gold ore..... 1166
lubricants..... 1098
mill machines 1170, 1171
specific gravity 1159
Testing 1136, 1988
a Frue vanner..... 1171
Bardwell sorting tube 1988
bibliography for 1173
by bottle amalgamation 1996
heavy solutions 1156, 1993
oil 1155
classifiers 1144
suited for 1989
for a process 1161, 1996
flotation 1562
Delprat and Potter processes 1993
Elmore process 1993
Van Meter process 1991, 1992, 1993
jigs 1150
suited for 1989
magnetic separators suited for 1993
magnets, double-pole..... 1993
Wetherill separators..... 1994
of black sand. W. Fawcett 2048
gold mill tailings. W. E. Darrow 2049
ores. H. Van F. Furman 2048
mill 1168
ore from mine..... 482
ores. M. Lenicque 2048
plant at Denver. G. R. Delamater..... 1997
T. Tonge 2049
Mill 141 1764
of H. E. Woods. A. Lakes 2048
the California Ore Testing Company 2049
roasting for magnetic separation 1995
screens suited for 1988
under water..... 1139
wire *versus* plate 1137
tools for 1137
Wilfley table suited for 1990
Tests, amalgamation 1156
at the Homestake mill in 1897. A. J. Clark .. 2047
Bring's test on suction jig..... 1461
by Elmore vacuum oil process 1559, 1560
hand picking 1163
compared with mill work..... 1168
fourteen-day test of Richards' pulsator classifier at Mill 162 1391
hand concentration. W. McDermott 2049
sorting, at Mill 162 1842
metallurgical 1167
Tests of American Process Company drier 1599
breakers 59
Callow cone on Butte copper slimes 1404
classifier jig at Mill 120 1452
Deister concentrator at Mill 101 1489
feed and discharge of Abbé tube mill 1290
finished products of tube mill 1290
Gates and McCully breakers 45
grains in free settling 465
Grill drier at plant of Empire Portland Cement Company 1597
Hancock jig on Montana sulphide copper ore 1442
hindered settling..... 1428
by pulsion jig 623
McLeod, Wilfley and Overstrom tables at Mill 162 1493
mill work 38
oil concentration at Mill 172 1874
ores on Wetherill magnetic separators 808
power at Mill 173 1927
Richards' pulsator jig 1456
roasting pyrite for magnetism 1544
simple Allis-Chalmers type steam stamp at Mill 182 1909
single-cylinder steam stamp at Mill 182 1254
steeple compound steam stamp at Mill 181 .. 1254
Sutton, Steele & Steele dry table..... 1555
telluride gold ores separation by crushing and screening 1566, 1567
trommel products at Iron Mountain, Missouri 384
Woodbury jig at Mill 162 .....1449, 1450, 1451
work of classifiers 461
on absorption of gold by plates..... 765
British Columbia ores, flotation 2048
compressive strength of stone 300
film sizing 707
Haverstraw sandstone at Watertown Arsenal.. 300
hindered settling..... 610
insterstitial currents 626
jigging mixed sizes..... 630
Nordberg steam stamps 1261
sands, regrinding. C. Butters 2014
smooth and corrugated vanners..... 650
stone at Berlin 301
Munich 301
strength of rock 311
suction in jigs..... 627, 630
vanners 664, 666
place and value of small ore. E. H. Simonds.. 2049
screen sizing test and assays on feed and products of Huntington mills 1317
on classifier jig feed and tailings at Mill 120 1453
feed and products of double-cone classifiers 1668
Huntington mills..... 1316
feed to flotation plant at Mill 130..1721, 1724
Hancock jig, also on middlings ... 1443
Harz jigs at Mill 144 ..1772, 1773, 1774
Woodbury slime classifier at Mill 162..... 1449
material conveyed in pipe launder at Guanajuato 1595
mill feed at Mill 139 1750
Mill 144..... 1772
products from ball mills 1302
Bryan mills 1310
Bryan mills, high-speed rolls and Huntington mills 1317
coarse and fine rolls at Mill 162 1328, 1329
De Kalb's classifier 1402
fine grinding system, Mill 105 1638
Griffin mill 1636
grinding pans 1284
at Mill 130 .....1720, 1724
Huntington mill at Mill 117 1669
Richards' vortex classifier at Mill 144.....1775, 1776, 1778
sand treatment at Mill 117 1671
settling tanks at Mill 144....1776, 1777, 1779
Sherman settling tanks at Mill 132. 1406
spitzkasten at Mill 144 .....1777, 1778
stamp mortar at Mill 180..... 1905
tailings and concentrates from stamps and Lane Chili mill, comparative . 1309
from Mill 174 1887
Woodbury jig at Mill 162 ...1449, 1450, 1451
sizing and assaying..... 1163

Tests to show relative efficiency of regrinding machines 1331
See Sizing Tests.
Tetradymite, specific gravity of 1189
Tetrahedrite, specific gravity of 1189
Thallium, atomic weight of 1188
Thames district, amalgamated plates in 750
mills in 1111
plates in 788
New Zealand, mills at 1180
shoes and dies at 183
stamps at 226
Thatcher, Arthur viii
Thayer portable one-stamp mill 1137
stamp mill 1181
Theoretical and actual crushing ribbons of rolls 101
capacity of trommels 377
value for hindered-settling ratio 1427
of free-settling velocities 1421
Theory of crushing 303
electromagnets 790
flotation processes 1555
flow in launders 876
of sand and water in launders..1592, 1593, 1594, 1595
slime settling 1149
suction 1462
tube mill action 1336
work required for crushing 304
Thermo-electric couple with pyrometer in Wilfley roasting furnace 1548
Thetford, Quebec, asbestos dressing at 817, 838, 1178
mill at 1079
Thickness of amalgamated plates.....737, 744
bank in trommels 378
bed on fine concentrators 644
on vanners 660
bottom bed on jigs 575
film in film-sizing tests.....716, 718
on slime tables.....695, 697
canvas tables 702
hard amalgam on plates 761
ore on belts of magnetic separators 807
stamp die 207
plate or wire 371
screens 341
screens, effect on percentage of opening 369
water film on amalgamated plates 746
Thick pulp extractor, Ayton 1419
Thies, A., and W. B. Phillips, stamp mill at Haile gold mine, North Carolina 1175
method of chlorination at Mill 98 1622
Thiré, A., gravity stamps.....224, 225
Thirion classifier 475
Thomas breaker 57
J. 228
log washer 324, 335
R. A., Dolcoath tin mill, Cornwall 1183
slag, mill for 1177
Thompson, experiments on magnet 794
H. N. 1178
dressing asbestos at Thetford, Quebec 1178
pneumatic concentration at Thetford, Quebec 838
pulverizer 234
bibliography for 294
S. P., electromagnets .....xx, 833
on magnets.....794, 795
Thomson-Houston dynamo 1055
Thorium, atomic weight of 1188
Thoulet, J., experiments on very fine kaolin 477
on settling rates of fine grains 474
settling in water 1176
velocity of spheres of different density and size 477
Thoulet's solution 1156
Three-high rolls 107
-mineral separation 906, 911
on jigs 590
riffle tables 680
Throw of Comet breaker 43
Gilpin County bumping table 681
Hooper vanning jig 506
jigs.....514, 518, 553, 594
Johnston vanner 1503
Rittinger tables 668
Salzburg table 683
shaking plates 741
Stein, Bilharz, and Luhrig tables 670
vanners.....653, 654, 655, 658
Thrust of gravity stamps 195
Thulium, atomic weight of 1188
Thum's compound rolls 110
Thyng, W. S., details of a hand jig 2021
Ticonderoga, New York, graphite mill at 1075
Tierra Seca gold separator 835
Tiger & Poorman mill 954
Tight and loose pulleys for jigs 532
Tightener on belt conveyors 860
Tighteners for belts 1094
stamp belts 198
Tilly Foster mill 1175
magnetic concentration at 810, 833
mine, costs at 1135
Tilting frame for Wilfley table 1467
Timber for mortar blocks 145
riffle blocks 721
Time of cleaning plates 757
required by cyanide operations at Mill 117 1672
for magnetic roast 1544
retorting 783
roast in galena roaster 1548
Tin amalgam 730
atomic weight of 1188
bronze plate screens 174
concentration in the Carolinas.....2046, 2047
dredging in New South Wales 2034
dressing 1081, 1184
at Mt. Bischoff, Tasmania. S. Fawns .2037, 2040
at the old Clitters mine 1915
bibliography for 1173
in Bolivia. D. H. Bradley, Jr 2041
Cornwall, England. W. R. Lewis 2037
Tasmania. R. Stokes 2046
the Malay Peninsula. W. H. Derrick 2039
industry of Tasmania. R. Stokes 2046
mining in Indo-China 2037
ore concentration. J. B. Hill, D. A. MacAlister 2046
Cornish, crushed by Husband stamp 141
frames for 704
crushed by Sturtevant mill 228
dressing of. R. H. Richards and C. E. Locke 1924
roasted for porosity 829, 839
roasting of 56
runs in Cornwall on 478
separation of, at Altenberg 9
worked at Irish Creek, Virginia 288
pellets, recovery of. M. Baldauf 2030
plate screens 173
specific gravity of 1189
washing. J. H. D. James 2035
in Cornwall 2047
the Malays. R. Stokes 2046
Tintic district, Utah, mills in 1040, 1041, 1045
Tires of rolls 65, 66
Titanite, specific gravity of 1189
Titanium, atomic weight of 1188
Toggles, for Frue vanners 645
Toldt, F., chilled iron shells 111
Tomboy Gold Mines Company 1923
Limited. "The 60 Mill" 1660
Tombstone, amalgamating pans at 290
Arizona, mill at 1175, 1180
silver milling at 1016
mill, jigs in 639
Ton, definition of .....vi, 883
equivalents of 1187
of water 1187
Tonge, Thomas, concentration from dumps at Leadville, Colorado 1179
ore testing plants 2049
Tonopah Mining Company's mill. S. A. Worcester 2037
Milling, and Development Company, Boss
cantilever stamp-frame at 1272
Pachuca stamp battery at 1272
Tools for testing 1137
truing roll shells 70
Toothed rolls 111, 112, 1080
description of Allis-Chalmers type 1242
table of sizes, capacities, and power 1243
Topaz, specific gravity of 1189
Top layer on jigs, defined 495
Total cost 1123
dimensions, area, and thickness of plates 744
Totten & Hogg, makers of Forster breaker 25
Toughness of minerals, effect of 2
Tourmaline, specific gravity of 1189
Tower driers 1600
at mills.....1807, 1813, 1860
screens at mills 1809, 1822, 1824, 1825, 1861, 1863
Trachyte, strength of 301
weight of 1190
Trajectory of particles 4, 838

Trajectory, use made of, in mills ... 889
Tramming, hoisting, pumping, etc., expenses ... 1123
Tramway at mills ... 1696, 1719, 1769
Transporting power of water ... 878
Transvaal, milling in the. J. H. Hammond ... 2033
milling in the ... 2041
stamps in ... 225
Transverse traps with gates ... 772–773
Transylvania, Laszlo amalgamator in ... 777
Trap rock, weight of ... 1190
Traps, bibliography for ... 787
box ... 773
for mercury ... 768, 771, 1516
transverse with gates ... 772–773
Trautwine, figures on discharge from launders ... 877
flow of water ... 858
Hering and, launders ... 885
J. C., Jr. ... 1197
civil engineers' pocket-book ... xx, 1174
coefficient of efflux ... 404
strength of stone ... 316
Travel of belt vanners ... 648
on Stein, Bilharz, and Luhrig tables ... 670
vanners ... 659, 660
vanner belts ... 653, 657
Traylor all iron jig ... 2021
& Company, J. A. centrifugal pumps ... 1610
sand pumps ... 1588
centrifugal pumps at Mill 114 ... 1662
capacities of ... 1588
proper speeds for at various lifts ... 1589
Centripact screen ... 1352
classifiers at Mill 169 ... 1865
concentrator ... 2023
double-discharge mortar ... 1266
Engineering Company, Centripact screen ... 1360
Giroux mill ... 1864
Traylor gravity stamps ... 1278
high-speed rolls at Mill 158 ... 1825
Imperial screen ... 1348
jigs at mills ... 1864, 1867
rolls at Mill 169 ... 1864
sectional mortar ... 1267
Trays for Wilfley slimer ... 1504
in retorts ... 781
Treatment charge on zinc ores ... 1933
of middlings ... 1121
plates ... 750
general considerations ... 750
slimes ... 1121
schemes of mill ... 1613
Trego, T. J., roasting for magnetism ... 1568
roasting furnace ... 1548
at Mill 148 ... 1792
Tregoning pulverizer ... 235
bibliography for ... 297
Tremain steam stamp ... 136, 142, 2011
details of ... 139
number of drops of ... 138
Tremnitz, Huntington mill at ... 282
Trent Chili mill, sizing tests of ... 271
Engineering & Machinery Company, Monadnock Chili mills at Mill 144 ... 1775
L. C. & Company, on Chili mill ... 270
Trenton Iron Company ... 1195
gauge ... 1194
screen gauge ... 173
Mining and Development Company ... 1836
Trevarns (Camborn), tin mill ... 1083
Triangular gate spigot for jigs ... 528
Tributer's mill ... 1039
Trimountain Mining Company ... 1901
copper handbook ... 1925
Triple discharge two-stamp mills ... 209
expansion engines ... 1091
pumping engine ... 872
Triplex pump at Mill 117 ... 1674
rolls ... 1244
description of ... 1239
Tripoli mine, Ding's roasting furnace at ... 1548
Tripolite, settling rate of ... 474
Trippel, A., Krom jigs at the Manhattan mill ... 838
Georgetown, Colorado ... 838
Tripper for belt conveyors ... 860
discharging conveyor belts ... 1586
at mills ... 1691, 1883
Triumph vanner ... 652, 659, 1499
at Mill 101 ... 1627
Trommel, an improved ... 1360
conveyor at Mill 125 ... 1700
Trommel hole, relation to space between rolls ... 95
screens, cost of in mills ... 361
life, cost, and details of ... 352
used for jig screens ... 546
washing plates ... 488
shafts ... 351
Trommels ... 346, 384
See also Screens.
action of ... 373
arrangement of ... 364
at mills .. 1667, 1681, 1682, 1685, 1690, 1691, 1692, 1693, 1701, 1702, 1703, 1706, 1707, 1710, 1714, 1724, 1725, 1727, 1728, 1737, 1738, 1742, 1743, 1749, 1750, 1751, 1752, 1760, 1766, 1767, 1771, 1772, 1773. 1774, 1792, 1796, 1797, 1798, 1799, 1815, 1818. 1828, 1829, 1831, 1832, 1837, 1838, 1842, 1843, 1846, 1851, 1857, 1864, 1866, 1867, 1876, 1877, 1882, 1884, 1889, 1890, 1898, 1913, 1928, 1929, 1930
attachment of ... 355
capacity of ... 377
speed, etc. ... 359
cones, pyramids, and prisms ... 361
connected with log washer ... 323
construction of in mills ... 350
cylindrical ... 348
Denver Engineering Works, revolving grizzly ... 1353
depth of bank and quality of work ... 380
details of trommel screens at Mill 125 ... 1705
diameter of ... 349
dimensions and operation of ... 347
driving mechanism ... 356
effect of centrifugal force in ... 373
diameter of ... 379
length and slope ... 378
slope in ... 377
speed of ... 379
feeding of ... 357
for dredges ... 1007, 1008, 1012
friction angle in ... 374
Gates all-iron frame revolving screen ... 1353, 1360
in stamp mills ... 1017
kinds of, in mills ... 348
length of ... 349
life, speed, slope, etc. ... 362
Neuerberg ... 385
octagonal ... 1353, 1360
path of grains in ... 377
pitch angle in ... 376
position of ... 1108
power for ... 357
principle of ... 346
purpose of ... 346
rate of travel of ore in ... 374
receiving cones for ... 358
Schmidt spiral screen ... 363, 364
sectional ... 1353
sizing tests on .. 381, 382, 1140, 1141, 1142, 1143, 1144
slope and length ... 380
slope of ... 349
speed of ... 349
speeds, pitch angle, etc. ... 376
spiders for ... 352
submerged trommels at Mill 125 ... 1356
systems of ... 364
tandem and concentric ... 362
tests of work of in mills ... 381
thickness of bank in ... 378
use of wash. C. Blömeke ... 2018
versus Rowand incline screens at Mill 141 ... 1764
riddles ... 365
wash ... 55, 329
water for ... 358
wear of screens ... 356
without internal shafts ... 351
Trough classifiers ... 389
double ... 416
or shallow-pocket classifier ... 1371
washers ... 319
bibliography for ... 334
washing for corundum ... 1078
Troughs. See also Launders.
for mercury traps ... 772
jerking ... 861
Troy weights, equivalents of ... 1187
Truesdale coal breaker ... 2050
Truing roll shells ... 69
Sturtevant roll shell turning device ... 1243
with an emery wheel ... 1243
Trunking machine ... 321
table ... 320

Trunking table for cleaning jig concentrates 587
Trustedt magnetic separator 835
Tube mill, a double 2017
action, theory of. H. A. White 1323
crushing efficiency of. W. A. Caldecott and S. H. Pearce 1323
experiences in El Oro, valuable. C. Butters 2016
feeder, a special. W. H. Fox 2014
E. G. Banks 2013
grinding in New Zealand. 2013
on the Rand 2017
installations, design of. A. James 2014
liners, wear, cost. S. D. McNicken 2016
lining at the Standard mine. W. W. Bradley 2013
patents 2017
practice in S. Africa 2015, 2016
New Zealand 2014, 2015
S. Africa. K. L. Graham 2013, 2014
W. R. Dowling 2013
results in S. Africa. H. Leupold 2016
mills 233, 1285
Abbé 1280, 1298
mill at Guanajuato 1290
capacity of 1291
at Mill 103 1271
Alsing 1280, 1294, 1323
Allis-Chalmers 1323
an article on. A. H. Bromley 2013
at El Oro. E. Burt 2013
Guanajuato, Mexico. C. W. Van Law ... 2014
mills 1532, 1770, 1922
the Gold King mill, Colorado. F. E. Shepard 2014
the Waihi mines. R. Stokes 2014
bibliography for 293
capacity of 1291
classification of 1285
consumption of pebbles and liners 1291
at Mill 118 1291
cost of grinding by 1291
Davidsen 1280, 1297
Denver Engineering Works Company's mill 1280, 1296
direction of rotation for 1289
discharge of 1287
discussion of the. A. James 2015
A. W. Warwick 2015
efficiency of 1292
El Oro lining for 1340
feeding of 1288
P. Argall 1323
feed opening for 1287
for cement grinding 2017
fine grinding. Davidsen 2015
foundations for 1286
Gates 1280, 1296
general notes 1294
Hardinge conical 1280, 1296
in S. Africa, work of. S. H. Pearce and W. A. Caldecott 2013
liners for 1286
linings for, discussion by H. A. White.. 1339, 1340
management of 1290
on the Rand, advantages of 1644
complete account of 2015
operation of. H. Fischer 1340
pebbles or flints for 1288
power required to operate 1289
quality of work done by tube mills 1290
sizes best suited for feed to 1288
speed of rotation for 1289, 1337
theory of tube-mill action 1336
versus grinding pans 1282
R. C. Clark 2014, 2016
in Australia 2014
with central end discharge 1294
work of 2013
Tubular classifier 421
investigation of free settling 469
on fine grains 473
Richards' 428
tests on hindered settling 610
results of 613
driers, cylindrical driers 1596
free-settling classifiers 1381
Tucker, W. A. viii
Tuff, machine best suited for crushing 2010
Tullock concentrators, water used in 659
feeder 136, 854
for gravity stamps 199
Tullock feeder for jigs 549
rolls 71
trommels 358
used in Bryan mills 272
Huntington mill 278
vanner 652, 656, 659
Tumbler on dredges 1008
Tungsten, atomic weight of 1188
in Colorado, concentration of. H. R. Van Wagenen 2035
mills of Colorado, ideas on the 2046
ore concentrates, cost of producing in Colorado 1987
ores in Colorado, concentration of. H. R. Van Wagenen 2041
treatment of. W. Greenawalt 2038
of Colorado, mills that treat the 2042
treatment of 2047
Turbine water wheels 1089
Turbo log washer 1341
at Mill 154 ..... 1341, 1816
power required for 1816
Turgite, specific gravity of 1189
Tuscany, mills in 1177
mill for quicksilver ores 1074
Tustin mill 316, 1014, 1047
bibliography for 294
number used 231
power needed for 311
sizing tests of products of, in Oro Plata, and Utica mines 309
theory of crushing by 310
Tustin's pulverizing mill 233, 262
Tuttle, E. G., double discharge on the tail of a jig 640
tail discharges on a Harz jig 640
Manufacturing & Supply Company, rolls..... 76
slime table 687
Tutty, E. J., on capacity of jigs 602
Twelve Apostles mill, amalgam in 767, 783
Two-current classifier 1144
-stamp mills 209
-mineral separation on jigs 589
Tye 707, 727
Tyler Company, W. S., wire cloth screens 1366
double-crimped screens 354
mining wire cloth 1364
screen cloth used at Mill 101..... 1626
gauge 173
screens 171
used on Waddell Chili mills at Mill 174 1886
trommel screens at Mill 142 ..... 1766, 1767
W. S. Co., cost of screens 548
double-crimped wire screens 370
mining wire cloth 1364
table of screen meshes..... 1196
testing screens..... 1138
on material for screens 355
Wire Works Company 1194
Types of rolls 75
steam stamps 114

U

Ullrich magnetic separator 1535
at Australian Metals Company's mill..... 1535
Ultra-microscope 1419
the, for the study of slimes 1401
-violet rays for the detection of willemite. E. K. Judd 2048
Ulzer, F. and A. Fraenkel, chemical-technical analysis xx
Schone's tubular classifier..... 476
Uncle Sam Consolidated Mining Company, Callow cones at 1404
Undercurrent 726
classifier, Richards' 1386
for saving black sands. R. H. Richards 2020
Under-piston jigs 520
Undershot water wheels 1090
Undersize, by different speeds of crushing, variation in the per cent. of. A. W. Gartrell..... 2017
Unfinished grains 318
Union Bay, Vancouver Island, coal washer at 1106
Iron Works 1184
amalgamating pan 243, 244, 245, 246, 247, 249
Blake breaker 21
Dodd tables at Mill 96 1618
grizzlies 337
iron battery frame 228

Union Iron Works iron frame vanner 651
mortar bolts 150
mortars at Mill 117 1668
on classifying vanner feed 658
design of cams 196
stamp clearance 195
vanners 655
rolls 72, 111
stamp details of cylinder, water used and capacity 126
frames 153
stamps at Mill 96 1618
steam stamp 114, 117, 118, 119, 122, 123, 126, 127, 128
mill 947
of the Standard Mining Company xxvi
Gratz, Kentucky. R. B. Brinsmade 2038
Mining Company, Pinder concentrators at 1481
Unit of magnetic force 791
pole of magnetism 791
Units of measurements 1187
United Iron Works Company, Cleveland-Knowles magnetic separator 1542
States Metal Reduction Co. The Leighton magnetic separator 1528
Standard gauge 1195
screen gauge 173
University of Minnesota, testing plant 1176, 1179
Unlocking of mineral by crushing 303
Unwaterers 879
Unwatering wheel at Mill 141 1591
boxes 450
for jig concentrates 586
tailings 588
mechanical 879
screens 724, 879
sieves for jig discharges 586
tailings 587
table of details of in mills 451
tailings 587
wheels 1590
Unwin, W. C., development and transmission of power xx
rope transmission 1095
transmission of power 1174
Upper Silesia, mill in 1177
Urals, placer mining in the. C. Tappan 2036
Uranium, atomic weight of 1188
Uren belt table 698
Urie dredge 1011
Use of steam in settling slimes at Mill 144 1779
Useless apparatus 1109
Uses and method of working of amalgamating pans 248
of pulverizers 232, 236
steam stamps 134
supplementary principles 5
water in breakers 49
trommels 358
Utah Copper Company 1852
Bingham, Utah, milling the ores of. P. Barker 2043
mill, Bingham, Utah 2038
mill, Garfield, Utah, the mill of the. L. H. Beason 2045
cost of milling in 1129, 1134
producing copper in 1955, 1956
district, cost of producing lead and silver in 1966, 1967, 1968
mill, flow sheet of the University of 2046
mill in 1085, 1174, 1184
Ute & Ulay mill ..... xxvi, 935
Utica, California, milling practice at. W. J. Loring 2043
Utica cam stick 200
Company mills 1024, 1033, 1034
mine, sizing tests on ore from 309
mill 1033
California, stamp practice at the. W. J. Loring 2033
of the Utica Company xxviii
stamps 224
mills 1176
plates in 788
Stickles canvas plant 1038
mill xxviii
Utsch jig 519, 640, 641, 837

V

Vacuum dredge 1009
oil-process, Elmore 1556
Vale, W. H., gravity stamps 224
amalgamating plates 788
Valentinite, specific gravity of 1189
Value of ore affecting extraction 1117
precious metal contents of zinc ores 1939
Valve for steam stamps 122
gears of Nordberg steam stamps 1249
motion for steam stamps 122, 127
of Tremain stamp 138
Valves for pulsion jig 520, 538
of Nordberg steam stamps 1249
on engines 1091
Vanadium, atomic weight of 1188
Van Law, C. W., discussion of tube mills at Guanajuato, Mexico 2016
Meter Boss oil concentrators 2044
J. W., system of oil-concentration 1992
oil-concentration process at Santa Barbara 1993
process 1997
testing apparatus 1991, 1992, 1993
Ryn Gold Mines Estate mill. G. A. Denny 2041
slime treatment at 1410
Wagenen, H. R., concentration of Colorado tungsten ores 2041
tungsten milling in Colorado 2035
Vanners 1464, 1498
action of 644, 646
adjustment, feed, capacity, etc. 648
of travel, slope, and water 660
agitation ratio 665
Akens and Evans slimer 1500
Allis-Chalmers suspended frame 1503
arrangement of 1110
at mills 1686, 1687, 1739, 1778, 1780, 1868, 1870, 1929, 1930
banks on 652, 656, 662
bed of pulp on belt in 660
belt 647, 657
Woodbury 655
belts, corrugated *versus* smooth at Mill 167 1859
"crack-proof" vanner belt 1503
details of 648
Spadone concentrator belt 1503
bibliography for 727
box-cleaning device used at Mill 167 1503
capacity of 662
cards of 657
classification of 645, 1499
classifiers for 658
Colorado Iron Works 652
concentrating and cleaning planes 646
consistency of pulp for, Mill 163 1848
cost of 691
repairs 663
coupled with slime table 1110
"crack-proof" vanner belt 1503
depth of bed 1510
dry 838
Ellis 657
concentrator 1499
Embrey 653
end-shake 652, 1153, 1165
feed, proper consistency for 1404
feeder 655
for testing 1153
Frue 645, 1153, 1499
G. Gates, end shake 653
Gates Iron Works 651
gyrating 657
in the plane of the belt 1501
F. T. Snyder 2022
Horn rotary slime concentrator 1499
in reserve 1109
Johnston 652, 1499, 1501
Joshua Hendy machine works 652
losses on 656
modifications of Frue 651
Norbom 652
operation of 657
plates on 740
power for 663
principle of 644
separation by 665
quality of feed 658
quantities of water in 659
removal of concentrates 647
repairs on 663
results at Mill 101 1628
Risdon Iron Works 651, 652
side-shake 645, 1499

Vanners, side-shake *versus* end-shake 655
slope in degrees and inches 1191
Snyder 657
Spadone concentrator belt 1503
speed, travel, slope, water, etc. 658, 659, 660
steep end-shake 1165
testing 1171
tests on 664, 666
thickness of bed on 660
Triumph 652, 1499
Tulloch 652, 656
concentrator 652
Union Iron Works, iron frame 651
versus convex slime tables 691
with tipping or undulating motion 1501
Johnston vanner 1501
suspended frame vanner 1503
Woodbury 654
Vanning shovel 1152
tests 1170
plaque 1152
Vapart disintegrator 236, 289, 891
at Lintorf, Prussia 830
bibliography for 299
Varney amalgamating pan 291
Vats for electroplating copper plates 755
silver plating 755
Vaucron mill 1178
classifiers at 416, 477
jigs in 641
number of sieves for jigs 590
rolls at 110
sieve scale at 367
stroke of jigs at 594
V-box classifiers 419
Vein quartz, weight of 1190
Veitch, Alexander, on Hancock jig 1441
Velardeña Mining and Smelting Company 1742
Velocities, application of free settling to classified design 1432
ratio free to hindered settling to classifier design 1433
full-teeter velocities of quartz and galena 1430
free settling 471
of currents in classifier 429
fall of minerals in water 621
settling curves of 467, 473
particles falling in water and in air 837
water in film sizing tests 716, 719
Velocity card of steam stamp 132
curves of gravity stamps 216
of a sphere falling through a viscous body. Sir G. C. Stokes 1433
current in settling tanks 454
fall of lead shot 626
flow in launders 877
galena and quartz falling in water. R. H. Richards 1433
pulsion in jigging 1460
rolls and stamps 314
settling, effect of 4
of fine grains 473
grains 466
under free-settling conditions 1421
vibrations of Wilfley table deck 1466
water on jigs 595
waves on amalgamated plates 746
Venezuela, mill in 1127
Ventilation 1099
Verdigris on amalgamated plates 750, 762
Verein Chemischer Fabriken 1914
Vermilion hematite, action of Monarch breaker on 28
Vertical and horizontal shafts of amalgamating pans 241
mills 255
Vezin feeder for rolls 71
H. A. viii
effect of strength and specific gravity on crushing power 316
on belts 1094
cost of mills 1126
dust prevention 1099
heating mills 1099
intermediary jigs 642, 1179
jig plunger clearance 530
samplers *versus* hand sampling 884
sampling 850
stroke of jigs 594
testing jig 1151
weight of broken ore 1190
wet screening 1139
Vezin jig 1150
journal pressure in rolls 96
rolls 84
sampler 846, 1572, 2032
for sampling high-grade telluride gold ores 1573
requisites to accuracy when using ..... 1575.
samples at mills 1691, 1701, 1737, 1742, 1748, 1750, 1772
springs for rolls 90
Vial magnetic separator 835
Vibracone separator, the 1352, 1360
Vibrating grizzlies 341, 345
and riddles 1346
Vibrations in vanners 658
Vibrometer screen. W. W. Beaumont 2018
Vibromotor screen 385
Vickers-Maxim steel roll shells at Mill 128 1714
Victor turbine wheel 1089
Victoria mill ..... xxix, 1052
mills in 1180
New Zealand, weight of ore 1191
milling in 1176
stamps in 224, 226
Vieille mill 906
Montagne Company 1116
heating ore for friability 9
mill 911
separation of pyrite and blende 829
new Central mill 1786
Vigeon, E. C., wear of steel balls 1303
Villefort, Lozere, France, belt tables at 700
mill at 1178
Virgilina, concentration at. E. K. Judd 2038
Virginia City, Nevada, milling practice at. C. T. Rice 2038
mill, amalgamated plates in 767
pyrite mills. R. H. Painter 2037
zinc ore, concentration of. T. L. Watson 2042
Viscosity of liquid, effect on free settling 465
Vivianite, specific gravity of 1189
Vogt, G 1186
Vogt, G., testing of clays 1185
Volts. See also Power.
Volume of broken ore 1190
units of 1187
Von Dessauer, H. A. 789
on amalgamated plates 767
Hauer, J. 838
Reytt, K. 308, 316, 1107
breaking 60
moisture in ore 1106
power and surface measurements, table of results of 306
for stamps 205
used by rolls 98
sizing test of breaker product 47
tests on work required for crushing 305
Vortex classifiers, Richards' annular vortex classifiers 1382
at mill 124 ..... 1692, 1693, 1694
Richards' pocket vortex classifier 1373
single-spigot 1377
tank vortex classifier 1379
for classifier 403

W

Wad, specific gravity of 1189
Waddell Chili mill at Mill 174 1886
Wagemann, C., tin concentration at Ploermel, France 1177
Wage scale at mills 1619, 1621, 1622, 1626, 1629, 1633, 1657, 1664, 1676, 1678, 1680, 1685, 1687, 1688, 1690, 1698, 1705, 1712, 1730, 1745, 1757, 1794, 1804, 1816, 1820, 1830, 1841, 1848, 1852, 1859, 1865, 1881, 1919
in the San Juan district of Colorado 1980
Wages of labor 1100
Wagner mica-plate static machine used with Blake-Morscher electrical ore separator 1551
Wagoner, L. 262
formula for free settling 472
free settling in water 477
theory of power required in crushing 310
Tustin mill 264, 294, 316
velocity of particles falling in water 478
Wagons for concentrates 1112
Walburn and Swensen Company 77
rolls 76
breaker of Blake type 23
Waldeyer on riffles 721
Wales, dry separation in 820
Wales, gold milling in. W. H. Booth 2035

Wales, milling of lead and zinc in northern. E. Walker 2039
Walker, E., the Elmore flotation process 1569
pulverizer 236
bibliography for 299
Walker's patent stamp 227
Wall finger gear rolls 111
jig 2021
Wallace, Idaho, mill at 947
steel breaker 2010
Wall's mill, Bingham Canyon, Utah 2038
Waltl, V., Oberegger gyrating screens 386
Wunderlich trough classifier for coal 478
Wann, E. E., discusses fine grinding 2016
Wappler, A. F., Fröbel's mill 291
Ward, W. P., Hundt's settling tub, Rittinger's *setzrad*, Rittinger's pointed boxes 478
Stapff and Cazin jigs 643
Wardner, Idaho, mill at 945, 1183
Waring magnetic separator 1182
separators at Mill 148 1792
pulverator 234
bibliography for 294
system of magnetic separations, description of the 2026
Warp and woof on canvas tables 700
Warren, A. Sidney, free-settling velocities 1421
belt vanners at Mill 128 1715
Warwick, A. W., definition of slime 1399
discussion of the tube mill 2015
fine grinding 1340
in the tube mill 2015
finely ground slimes 1420
hand sorting in small mills 2032
history of concentration 2049
on slimes 2020
power for stamp mills 2044
stamp mill foundations 2044
the A. M. W. mill at Leadville, Colo. 2043
Wascott, stamps in Gilpin County, Colorado 229
Washburn & Moen 171, 1196
Washburn & Moen screen gauge 173
wire gauge 1194, 1364, 1999
Washers. See Log Washers.
Dorr mechanical classifier 1343
for clay 1076
log 55, 320
preliminary 319, 1341
trough 319
using rotating stirrers 1341
Washing before hand picking 481
box before hand picking 488
canvas tables 701, 702
clay and kaolin 1075
cocoa matting 703
devices on slime tables 689
diamonds 1080
drum at Mill 95 1617
followed by hand picking and sizing 1616
machinery 1244
ore at Elkton Mine 1616
pans 333
bibliography for 334
for corundum 335, 1078
diamondiferous earth 335
pits 335
placer gravel 723
preliminary, bibliography for 334
tank with hand picking 488
Washington, gold mill at Republic 2036
Washoe concentrator 1836, 2042, 2045
Copper Company 1836
district 1105
plant of the Anaconda Copper Co. L. S. Austin 2033, 2043
process 1039, 1173
of amalgamation 248
smelter 2042
Montana 1924
Wash trommels 55, 329, 1341
bibliography for 334
Bradford 330
Carnall 334
compared with log washers 333
Crickboom 330–334
cylindrical, used at Cabarceno, Spain 330
for disintegrating clay 335
Krupp 1341
versus log washers 333
water distributor for vanners 646, 654
Wilfley table 674
Wash water for trommels 358
on slime tables 684, 695
pipes on slime table 688
required by canvas tables at Mill 139 1755
Chalmers & Williams vanners at Mill 122 1687
Frue vanners at mills 1662, 1694, 1695, 1706, 1755, 1880
Harz jigs at mills 1744, 1751, 1752, 1753, 1877, 1878, 1879
James slimer 1492
table 1491
New Standard concentrator 1479
picking belt at Mill 154 1816
Richards'-Coggin classifier at Mill 173 1878
Richards' vortex classifiers at mills 1692, 1693, 1694, 1743, 1744, 1751, 1752, 1753, 1755, 1775, 1776, 1778
rolls at Mill 173 1877
round tables at Mill 180 1904, 1905
single-spigot classifier at Mill 180 1902, 1903
trommels at mills 1691, 1692, 1693, 1743, 1772, 1773, 1774, 1816, 1876, 1877
Wilfley tables 1469
at mills 1661, 1662, 1687, 1706, 1744, 1745, 1754, 1880
Wasp No. 2 mill, Kirk, S. Dakota 2044
Waste picked out in mine for stowing 481
Water, acid, effect of on screens 173
column, weight of 1188
consumption 2048
at Arizona mills 1931
Butte. C. W. Goodale 1420, 1997
Cananea. O. P. Findley 1419
Eureka Hill. G. W. Riter 2036
Longfellow concentrator 1931
mills 1413, 1622, 1640, 1648, 1664, 1698, 1699, 1700, 1706, 1709, 1712, 1715, 1730, 1731, 1746, 1757, 1762, 1786, 1794, 1802, 1816, 1817, 1840, 1848, 1853, 1856, 1859, 1865, 1875, 1882, 1887, 1891, 1894, 1897, 1912, 1932
Montana copper-sulphide mills 1931
Northern Mexico mills 1931
Shannon concentrator 1931
Washington, Arizona, plant 1411
in Arizona. D. E. Woodbridge 1997
Australasian practice 1713
on the Rand 1410
current in launders, speed necessary to carry sand 878
economy in mill. J. C. Scobey 1419
stamp milling. A. W. Warwick 2011
effect of temperature on amalgamation 766
flow of 885
for Atwood amalgamator 776
breaking rock after heating 9
classifier 403, 432
calculation of 429
Conkling jig 503
dredging 1013
Ferraris belt table 698
classifier 401
German sweeping table 703
gravity stamps, amount and temperature 221
Hallett table 676
Heberwasche 522
jigs 510, 519, 537, 598
Lake Superior hog trough classifier 390
log washer 324
mills 1102
Parsons table 669
& Fisher jig 518
Richards-Coggin classifier 392
Rittinger table 668
Salzburg table 683
Schmidt spiral screen 363
Schranz jig 503
sluices 723
spitzlutte 424
stamps 206
Stein, Bilharz, and Luhrig tables 670
Tamarack classifier 398
Tremain steam stamp 139
trommels 358
wash trommels 330, 331, 332
in coal washing, recovery. F. W. Parsons 2020
gravity stamps, amount and temperature of 221
launders, mean velocities of 877
stamp pulp 413
jet for disintegration 1007
measurement of 1161

Water on amalgamated plates ... 773
pipes for gravity stamps ... 199
jigs ... 538
power ... 1174
effect on cost ... 1128
for mills ... 1089
pumps ... 868, 871
quantities of, in rectangular launders ... 878
quantity for film sizing ... 707
slime tables ... 720
recovered by settling ... 460
recovery. G. E. Binckley ... 1419
at Goldfield, Nevada ... 2020
regulators ... 858
required by canvas tables at Mill 144 ... 1779
Card tables at Mill 144 ... 1777
classifiers at Mill 165 ... 1852
Evans and Hancock jigs compared ... 1442
Ferraris patent tables, table of ... 1490
Frue vanners at Mill 100 ... 1625
Hancock jigs ... 1441
working on Montana copper ores ... 1442
Harz jigs at mills ... 1692, 1693, 1694, 1772, 1773, 1774, 1775
Hodge jigs at Mill 180 ... 1902, 1903, 1904, 1905
Huntington mills at mills ... 1687, 1706, 1753
individual machines at mills ... 1698, 1699, 1700, 1780, 1816
jigs at Mill 126 ... 1707, 1708
Johnston vanners ... 1502
at Mill 165 ... 1852
log washers at Mill 154 ... 1816
New Humboldt concentrator ... 1494
Nissen stamps at Mill 165 ... 1852
Nordberg steeple-compound steam stamp at Mill 180 ... 1901
stamps at mills ... 1621, 1624
suspended frame vanner ... 1503
turbo at Mill 154 ... 1816
vanners at Mill 144 ... 1778
water jackets of Wilfley roaster at Mill 140. 1759
Wilfley slimer ... 1506
tables at mills ... 1625, 1694, 1695, 1708, 1776, 1777, 1852, 1904
Woodbury table ... 1496
separation. W. J. May ... 2021
softening of ... 1027
Collett ... 1319
spray pipe on Hallett table ... 676
supply at Mill 158 ... 1827
pumps for ... 871
table of weights and measurements of ... 1187
tanks ... 1106
tube boilers ... 1090
used by Brink & Hübner's disintegrator ... 286
Heberli mill ... 259
Huntington mill ... 280
Schranz mill ... 275
trommels ... 360
in Blake breakers, table of ... 26
breakers ... 49
Bryan mill ... 272
Forster breaker in Mill 67 ... 28
mills. See Individual Mills in Chapter XX.
steam stamps ... 126–129
on amalgamated plates ... 745
jigs ... 596, 597
slime tables ... 694
steam stamps ... 129
vanners ... 659, 660
value of miner's inch ... 1197
versus air for concentration ... 825
weights and volumes of ... 1187
wheel for arrastra ... 238, 239
wheels ... 1089
in mills. See Individual Mills in Chapter XX.
with classifier pulp ... 418
Waters, Theodore, Edison's plant in New Jersey ... 1183
Watertown Arsenal, tests on stone ... 316
strength of stone ... 300
Wauchope, J. A., stage crushing ... 2015
Waugh and Bignell, dry concentration process. D. D. Wolff ... 2026
dry vanner ... 838
Waverly mill, breaker in ... 60
stamps in ... 228
Nova Scotia, mill at ... 1026
Waves in film-sizing tests ... 717
on amalgamated plates ... 746
canvas tables ... 702
Waves on slime tables ... 695
Wear of Alsing cylinder ... 267
amalgamating pan ... 249
ball mill ... 261
belt conveyors ... 860
Blake breakers ... 25
breakers ... 56
Bryan mills ... 272
buhrstone mill ... 253
Chili mill ... 269
centrifugal pumps ... 870
Cyclone pulverizer ... 289
Dodge breakers ... 31
Forster breaker ... 28
Griffin roller mill ... 282
grizzlies ... 340
Heberli mill ... 259
Huntington mill ... 280
jigs ... 604
jig screens ... 547
log washer ... 324
pebbles in Alsing cylinder ... 267
punched steel screens at Mill 144 ... 1365
rolls ... 108
roll shells ... 66
at mills ... 1877, 1906
Schranz mill ... 276
screens ... 169, 170, 343
at Mill 139 ... 1365
effect of moisture on ... 341
in trommels ... 356
shoes and dies ... 182, 183, 184
in grinding pans ... 1284
steel ball in ball mills ... 1303
Sturtevant mill ... 288
Whelpley & Storer pulverizer ... 289
Wearing parts. See also each machine.
for jaw breakers, Krupp's ... 1221
stamp batteries, materials for ... 1277
steam stamps ... 121
life of ... 1222, 1223
materials for ... 1220
of Allis-Chalmers rolls at Mill 179 ... 1898
ball mills at Mill 159 ... 1828
Blake breakers at mills ... 1221, 1621, 1749, 1853
breakers ... 48, 56
life of ... 1221
Bryan mills at Mill 173 ... 1879
Buchanan jaw breakers at Mill 157 ... 1818
Butters' centrifugal pumps at Mill 117 ... 1671, 1672, 1674
Byron-Jackson pump at Mill 114 ... 1662
centrifugal pumps at mills ... 1711, 1712, 1856, 1904, 1905
drag or disc conveyors ... 1583
elevators at mills ... 1707, 1710, 1711, 1818, 1819, 1853, 1854, 1855, 1877, 1880, 1898
Gates breakers at mills ... 1706, 1716, 1727, 1828, 1853
Griffin mills at Mill 105 ... 1636
grinding pans, life of ... 1638
Hancock jigs ... 1443
Hodge and Cleaves sand pumps at Mill 182 1910, 1911
jigs at Mill 180 ... 1902, 1903, 1904, 1905
Huntington mills at mills ... 1317, 1669, 1687, 1711, 1753
Knowles duplex vacuum pumps at Mill 114 1673
triplex pumps at Mill 117 ... 1674
Krogh pumps at Mill 100 ... 1626
life of ... 1633
McCully breakers at Mill 139 ... 1222, 1749
Monadnock Chili mills at Mill 144 ... 1775
Nordberg steeple-compound steam stamp at Mill 180 ... 1901, 1902
rolls at mills ... 1244, 1685, 1686, 1710, 1714, 1771, 1773, 1774, 1854
materials for ... 1243
Sherman Huntington mills at Mill 132 ... 1728
spindle breakers ... 46, 47
stamps at Mill 118 ... 1677
Traylor centrifugal pumps at Mill 114 ... 1662
Waddell Chili mills at Mill 174 ... 1886
Wetherill magnetic separators ... 1525
Wilfley roasting furnace ... 1547
tables at Mill 126 ... 1708
Weathering diamond ore ... 1080
for separation ... 830, 839
garnets at Meronitz ... 831
of clay ... 1075

Weathering process at Mill 188 ... 1921
Webb City, Missouri, mills at ... 1175
Webb, H. H., and Pope Yeatman, hand picking in South Africa ... 483, 492
stamp mills in South Africa ... 225
Webber, W. O., centrifugal and reciprocating pumps ... 885
on pumps ... 868
Wedding, H. ... xx
concentrating Thomas slag ... 1177
magnetic iron oxides ... 813
separation of iron ore ... 2036
separators ... 833, 2030
Mumford & Moodie's separator ... 837
processes of separation ... 835
Wetherill process ... 836
Wedgewood mortar for amalgam ... 780, 1025
Weighing ... 1160
conveyor, Richardson automatic ... 2032
devices ... 1603
Avery automatic scales at Mill 105 ... 1635
Blake-Denison continuous weighers ... 1603
Libra scales ... 1605
machines, the Blake-Denison ... 1609
ore ... 883
Weight and power of steam stamps ... 133
of Akron Chili mills, table of ... 1308
amalgamating pan ... 243
arrastra ... 237, 238
Austin gyratory breakers, table of ... 1210
Bartlett Simplex concentrator ... 1487
Blake breakers at Mill 158 ... 1821, 1823, 1824
bosses at Mill 117 ... 1668
broken ore ... 1160, 1190
quartz ... 1185
cobbing hammers at Mill 186 ... 1917
Colorado Iron Works continuous grinding pans ... 1282
Comet breaker ... 41, 46
Denver Engineering Works Company's Blake breakers, table of ... 1204
dies in amalgamating pans ... 245
Ding's magnetic separators ... 1541
Dodge breaker ... 30
Farrel Blake breakers, table of ... 1200
Ferraris ball mills, table of ... 1300
patent tables, table of ... 1490
Gates ball mills, table of ... 1301
style "K" breakers, table of ... 1208
Gilpin County bumping table ... 681
gravity stamps ... 218
stamp mortars ... 164
hammers for breaking ... 11
Hathaway gyratory breakers, table of ... 1217
Humphrey rolls, table of ... 1235
improved Huntington mills, table of ... 1312
International magnetic separators ... 1535
Kennedy gyratory breakers, table of ... 1214
Kent roller mills ... 1304
Knowles' New Century magnetic separators, table of ... 1542
Krupp gyratory breakers, table of ... 1215
La Point flour gold separators, table of ... 1510
log washer ... 324
machines ... 1096
McCully breaker ... 44
gyratory breakers, table of ... 1212
McLanahan and Stone single-roll crushers, table of ... 1241
mills ... 1126
moving parts of Nordberg steeple-compound steam stamp at Mill 180 ... 1901
muller and shoes for amalgamating pan ... 246
new and old jaw plates for Blake breakers at Mill 100 ... 1624
New Standard concentrators ... 1479
Nissen stamps at Mill 165 ... 1851
ore for sampling ... 851, 852
parts of stamp ... 189
Pilling hoists, table of ... 1609
roll shells ... 66
samples in mechanical sampling ... 1575, 1576
Samson breakers, table of ... 1203
shoes and dies ... 182, 183, 184
at Mill 117 ... 1668
stamp parts ... 190
at Mill 118 ... 1677
stem ... 187
stems at Mill 117 ... 1668
stamps ... 209, 221
and effectiveness of blow, in gravity stamps 218
Weight of stamps at mills ... 1618, 1620, 1621, 1624, 1626, 1630, 1632, 1634, 1640, 1645, 1649, 1651, 1658, 1661, 1665, 1666, 1668, 1677, 1679, 1769, 1915
in California ... 1619
Witwatersrand ... 1643
Sturtevant balanced rolls, table of ... 1234
Dodge-type breakers, table of ... 1205
tappets at Mill 117 ... 1668
wearing parts, Blake breakers ... 26
Dodge breaker ... 31
Forster breaker ... 28
Wetherill magnetic separators, table of ... 1522
Wild roller mills, table of ... 1304
table of measurements of ... 1187
units of ... 1187
Weights for rolls ... 73
Weisbach, hydraulic power ... 239
P. J., manual ... xx
water motors ... 1174
Weiss, picking at ... 487
sieve scale at ... 367
Weldon, New Jersey, Lovett-Finney magnetic separator at ... 835
mill at ... 1180
Welkenraedt, double discharge on jigs at ... 584
mill at ... 1176
Rittinger tables at ... 668
Weller pulp thickener ... 2019
Wellman-Seaver-Morgan, Company, Akron Chili mill ... 1307
Garfield Chili mill ... 1305
gravity stamps ... 1278
sectional guides for gravity stamps ... 1270
Wells, J. W., molybdenite dressing ... 1567
mercury ... 768
Wendt, A. F., Wendt jig ... 640
crushing and jigging at Crown Point mines, New York ... 1174
jig ... 640, 901
connecting rods on ... 530
construction of ... 524
elliptical gear on ... 536
Wengler & Lowe's classifier ... 413, 478
hydraulic classifier ... 1367
Wenström magnetic separator ... 800
data on the ... 2025
products of ... 802
Wentworth Company, mill ... 1181
Goldfields Company, shoe and die used in mill of stamps ... 181
mill, plates in ... 227
Wessinger, H. J., on breaking ... 788
crushing hematite at Minnesota Iron Mine ... 60
West Argentine Co., iron stamp frame ... 60
Western Chemical Mfg. Co., Denver, Colo., milling at the mill of the. R. B. Hosker ... 225
Chihuahua, milling in ... 2045
Wheeled Scraper Co., jaw breaker ... 1664
Westphalia, jigs in ... 25
mill in ... 641
West Rand, slime settling at ... 1121, 1177
West Waverly Gold Mining Company Limited, mill ... 478
xxviii, 1026
Yankee concentrator of Detroit Copper Co., Bryan mills at ... 1309
effort to clarify water at ... 1416
Wet concentration *versus* oil process ... 832
magnetic separator, Conkling ... 810
screening tests ... 1138
silver mill ... 1039
water for ... 1105
versus dry concentration, bibliography for ... 837
Wetherill horizontal magnetic separator ... 805
inclined magnetic separator ... 807
J. P., magnetic concentrating plant ... 1054
cost of screens ... 361
magnetic separators ... 804, 891, 1156
results of tests of ... 808
Wetherill plant at Franklin, New Jersey ... 835, 1181
magnet ... 1156
treatment by the ... 2028
magnetic concentrating plant, Sterling Iron and Zinc Company mill ... xxix
mill ... 1060
separator ... 804, 1521, 2025
A. Smits ... 2026
at mills ... 1525, 1810, 1826, 1862, 1863, 1891, 1916
attendance required ... 1525
capacity of ... 1522, 1523

Wetherill magnetic separator, electrical and mechanical energy required by 1525
for separating molybdenite and biotite. 1568
Humboldt Engineering Works Company 1530
maximum size treated 1525
proper distance apart for the magnets of 1524
results from 2026
table of dimensions and weights 1522
wear and tear on 1525
width, thickness, and proper conveyor-belt speed for 1523
take-off belt speed for 1524
parallel magnetic separator 804
plant at Lohmannsfeld 2035
-Rowand magnetic separator at Mill 141...1763, 1765
separator in Arizona 2029
Germany 2029
ores suited for the 2029
types of separators. F. Essen 2031
Wethey, A. H., Chili mill 271, 1115
improvements in concentration at Butte 2036
Pratt ore sizer 1360, 2018
removal of wood 1609
Wilfley table 729
lifting magnet at Mill 164 1532
Wetted perimeter in launders 876
W. F. Mosser and Company 76
Wharton magnetic cobbers at Mill 157 ..... 1819, 1820
Steel Company, concentrating plant of 1818
Wheal Grenville tin dressing 1082
Wheel agitator 780
Wheeler amalgamating pan 291
H. A., on sizing tests of trommel products 383
pans 1282
fine grinding in. W. Broadbridge 2015
Zenas, tappet gib 188
Wheels, dewatering 1590
raff, for New Humboldt concentrator 1494
Wilfley middlings return 1468
sand wheels 864, 1586
Whelpley & Storer pulverizer 236, 289
bibliography for 299
whirling table 236
Whisk broom for plates 758, 760
White, F., fine crushing machines 316
H. A., formula for speed of revolution of ball mills 1337
theory of tube-mill action 1323
tube-mill experiments 1336
T., gravity stamps 224
Whitehead, Cabell and T. M. Chatard, settling of slimes at Republic gold mine, Washington 1176
C., settling slimes 1148
Whitney and Ober, colloidal theory of slimes 1419
effect of surface tension in preventing settling of slime 1414
slime precipitating agents 1416
W. R., chemicals for settling slimes 1419
Whole bed on jigs, defined 495
current box classifiers 443, 1402
labyrinths and runs 447
table of details of 444
means of getting 451
Wickes boilers 1000
Width of amalgamated plates 737, 740
belt elevators 863
jig sieves 591
rolls 83
Wilbraham rotary pump 925
Wild mill 1280, 1304
regrinding mill 2015, 2016
roller mill, table of sizes, capacities, power, weights, etc. 1304
rolls 72
Wildman Gold Mining Company xxvii
mill 1023, 1184
Wiley, H. W., agricultural analysis xx
settling in water 1174
Wilfley, A. R., Wilfley's slimer 2023
group 1464
Bartlett Simplex concentrator 1487
Card concentrator 1481
Christensen concentrator 1484
classification of 1465
cleaned-ore plane in 1465
cleaning plane in 1465
Deister concentrators 1488
depth of bed in 1510
Dodd buddle 1481
Wilfley group, Ferraris patent table 1490
James slimer 1491
table 1490
Luhrig-Buss table 1492
McLeod concentrator 1492
New Humboldt concentrator 1493
New Standard concentrator 1478
Overstrom table 1479, 1485
Pinder concentrator 1481
principles of action of 1465
roughing plane in 1465
Sutton, Steele & Steele dry table 1479
Woodbury table 1494
head-motion on shaking feeders at Mill 171. 1868, 1869
launders at Mill 141 1761
Impact screen. J. H. Collins 2018
roasting furnace 1546, 1569, 1923
at mills 1546, 1548, 1663, 1759, 1765
attendance required to operate 1548
capacity of 1548
consumption of fuel in 1548
fines in product sink in water 1547
pyrometer for regulating temperature in ... 1548
size of 1548
wearing parts of 1547
shaft roaster 2029
slimers 1504
A. R. Wilfley 2023
at mills 1628, 1729, 1730, 1855, 1856
feed best suited for 1505
head motion 1504
on natural feed 1505
operation of 1505
principle of operation of 1504
shaking frame for 1504
sub-frame for 1504
trays or decks for 1504
table 670, 1119
as a slimer 1478
coupled with slime table 1110
effect of appearance vii
feed, proper consistency for 1404
for testing 1153
raff wheel on 864
riffles on 721
testing 1171
test 1165
tests of, at Parrott mill 675
tables at mills ...1620, 1621, 1622, 1625, 1633, 1656
1657, 1661, 1663, 1669, 1686, 1687, 1689, 1694, 1695
1703, 1704, 1708, 1709, 1715, 1729, 1738, 1739, 1744
1745, 1754, 1761, 1776, 1777, 1779, 1780, 1811, 1812
1829, 1830, 1833, 1839, 1840, 1844, 1848, 1850, 1851
1852, 1855, 1858, 1867, 1870, 1880, 1885, 1886, 1893
1894, 1896, 1904, 1905, 1908, 1929, 1930
capacity of 1469
consistency of pulp for 1848
deck for 1467
description of 1465
elevator or raff wheel for 1468
feed box for 1468
for reworking dumps. T. Tonge 2022
testing 1471, 1990
foundation for 1465
gold saved by in western Chihuahua 1665
head motion for 1466
height of riffle cleats for 1468
in California practice 1619
Canadian mills 2022
investigation of work of 1469
on different feeds, a study of the. R. H. Richards 2022
operating conditions for 1469
riffle cleats for 1467
"setting up" and "leveling up" 1468
sized *versus* classified feeds for the 1478
speeds of vibrations of deck 1465, 1469
study of the. R. H. Richards 1511
tests on at Mill 162 1493
tilting frame of 1467
velocity of vibrations of deck 1466
versus Card tables at Mill 159 1830
other riffle tables 679
wash water required for 1469
Wilkens, H. A. J. 224
and H. B. C. Nitze, plates at the Haile gold mine 787
Wetherill magnetic separators 833
Wilkes, J. A., gold stamp mill 1178
Willemite, detection of. E. K. Judd 1997

Willemite, phosphorescence of 1931
specific gravity of 1189
Williams, Albert, Jr., bottom discharge tanks for settling slimes 476
on settling tanks 459
G. W., metallurgy at Broken Hill 1568
hinged hammer pulverizer 1281, 1322
J. R., burnt lime for settling slimes 477
cost of milling on the Rand 2049
definition of slimes 1399
slime precipitating agents 1416
Patent Crusher Company, hinged hammer pulverizer 1322
pulverizer 2015
Wills, J. L., Frisbee Lucop mill 294
Wilson, E. B., stamps for different processes 227
steam stamp 142, 143
steel for shoes and dies 185
Wiltsee, E. A. and J. B. Hobson, arrastra at Smartsville and Mooney Flat 290
Wimmer's jig 643
Windows 1100
Windsor cyanide plant, slime settling at 478
Wine Harbor, Whelpley & Storer pulverizer at 289
Wings in amalgamating pans 245
Winnowing ore dry 825
Winslow, W. H., Ryerson pulverizer 299
Winter, George W., Peck separator 839
Wire cloth, brass 1364
copper 1364
galvanized 1365
iron 1364
Manufacturers' Association standards 1364
phosphor bronze 1364
screens, cost of 361
stationary 340
Tyler double-crimped 370
steel 1364
tinned 1365
Tyler double-crimped mining wire cloth 1364
versus plate for testing screens 1138
punched plate for screens 354
for jig screens 546
gauges 1194
S. H. Stupakoff 2019
in screens, use of bronze 2019
netting for riffles on dredges 1012
picking belt at Mill 137 ..... 1438, 1740
rope elevators 862
ropes 1095
Wisconsin, concentration in 1568
southwest. G. S. Brooks 2038
Huff electrostatic separators in 1552
Iowa, and Illincis, milling the lead ores of 2038
Lead & Zinc Co., separation of blende and pyrite 829
practice at Mill 148 1792
roasting practice 1548
zinc milling in 2038
Wiswall pulsatory concentrator. W. S. Zehring 2023
Wiswell electric ore pulverizer 235
pulverizer, bibliography for 296
Witherbee, Sherman and Company mill .. 1053, 1054, 1059, 1117, 1820
products of Wenström separator at 802
Witherite, specific gravity of 1189
Witkowitz coal washery. H. Fillunger 2052
Witter, magnetic concentration 836
Witwatersrand, cost of producing gold in .. 1983, 1984, 1985, 1986
general milling practice in 1643
hydraulic stamp used in 1257
mill equipment on the 2012
milling on the, H. H. Webb & P. Yeatman 2035
practice on the. E. D. Chester 2035
Woakes, E. R., amalgam 789
at the Espiritu Santo mill at Cana in the Darien 788
amalgamated plates 759
concentration in the Kootenay district, B. C. .. 2034
Espiritu Santo mill, Cana, Darien 2033
remedy for hard amalgam 2024
Wolf breaker 56, 58
Wolff, D. D., Waugh & Bignell concentrator 838
Wolframite, hindered-settling test on 613, 617
separated from tin ores 829
settling velocity of 466, 469
specific gravity of 1189
Wolf-tongue classifier 1369
improved classifier 1387
Wolhuter mill, details of stamps 221
Wolverine mine, cost of mining and milling 1131
Mining Co. 1181
Wood and Laschinger, mechanical efficiency of sand wheel 1587
burned to recover gold 177
for launders 872
mill buildings 1088
riffles 721
slime table surface 688
stamp guides 155
frames for jigs 522
grizzlies 338
Henry E., amalgam trap for concentrating tables 1516
jig tanks 522
picked out by hand 482
pipes for acid water 1106
removal of. A. H. Wethey 1609
from ore 1607
at Mill 164 1849
removed by hand picking 480
removing device. A. H. Wethey 2031
required for drying 899
retorting 782
sieve frames for jigs 538
steam stamp 136, 2011
surface for slime tables 695
Woodbridge, D. E., Anaconda concentrator 2040
Arizona Copper Company 1923
and Sonora 1923
concentration at Cananea, Mexico 1923, 2038
in Arizona 2038
La Cananea mining camp 1923
ore dressing at Cananea 1419
water consumption in Arizona 1925
Woodbury-Benedict jigs at Mill 177 ..... 1892, 1893
bull jigs 1449
at Mill 164 1849
clean-up jig 1448
concentrators 1494
at Mill 117 1669
distributor 858
end-shake vanner 701
Evans, and Collom jigs, capacities compared ... 1448
Imperial concentrator 2023
jig systems 1440
J. T. Glidden 2022
jigs 1447
at mills 1448, 1449, 1450, 1451, 1900
differential motion for 1457
middlings jig 1448
slime classifiers 1447
at Mill 164 1850
system of ore concentration 1459
table 676, 680
vanner 654, 656, 659
belt 647
Wooden jigs, life of 604
Woods dry placer machine 838, 839
Wood's mill 235
bibliography for 296
Woodward, A. E. 476
Woolen blanket tables 703
Worcester, S. A.. design of milling plants 2049
Work. See Power.
done in crushing by rolls 312
of Blake and Dodge breakers compared 35
classifiers, quality of 461
steam stamps, quality of 134
required for crushing 304
ore 308
Your Own Diggings mill 1021
Working of amalgamating pan 248
Worthington centrifugal pumps at mills .. 1696, 1745, 1881
pump 920
at Mill 175 1890
Wrightson's coal-picking table 2021
Wrought iron, specific gravity of 1189
W. S. Tyler Company 354–355, 370, 1138, 1196
figures on cost of screens 548
Wulfenite, specific gravity of 1189
Wunderlich coal washer (classifier) 477
trough classifier 478
Wynkoop, N. C., mining in New Mexico 2036
W. Y. O. D. mill ..... xxvii, 1021
Wythe Lead & Zinc Co. 809
Mine Company, mill ..... xxix, 1065

X

Xenon, atomic weight of 1188

Y

Yagle Foundry and Machine Company, Blake rock breaker 1223
Yale, C. G., amalgamators 789
Huntington oscillating stamp mill 229
Huntington pan 291
Tustin mill 294
Yeatman classifier 399, 477
Pope and H. H. Webb, hand picking on the Rand 492
milling on the Witwatersrand 2035
on mill tests 1168
stamp mills in South Africa 225
Yellow Aster mill, Randsburg, California 2043
Dog mill, Missouri. R. L. Herrick 2042
ground 1080
Yield of small tests 1168
Ymir stamp mill. S. S. Fowler 2034
Yoke for magnets 794
Young's gold dredge 2043
Yreka, California, dredging at 1007
Ytterbium, atomic weight of 1188
Yttrium, atomic weight of 1188
Yuba River, dredging on 1013

Z

Zacatecas, arrastras at 238
Zaratite, specific gravity of 1189
Zeile Mining Company mill ..... xxviii, 1034
Zenner 479
Zinc amalgam 730
for brightening mercury 785
atomic weight of 1188
Zinc blende and barytes, separation by decrepitation and screening 1565
chloride, a heavy solution for testing 1993
cost of producing 1968
ore, magnetic separation of 809
mill for 893, 903, 909, 910, 911, 958, 961, 965, 1004, 1005
See also Blende.
ores, foreign schedules 1933
impurities affecting value of 1932, 1933
Joplin zinc ore penalties 1939
ore prices 1939
marketing 1997
mills for 892, 900, 908, 1060, 1065, 1066
roasted for porosity 829
schedules for calculating value of 1932
separated by roasting and magnetism 814, 815
treatment charge on 1933
value of precious metal values 1939
western zinc ore prices 1933, 1938
plant at mills 1718, 1746
required in precipitating boxes at mills 1628, 1632, 1641, 1673, 1678
specific gravity of 1189
sulphate solution 1156
Zincite, specific gravity of 1189
Zircon, specific gravity of 1189
Zirconium, atomic weight of 1188
Zirkler, H. xx
German mill schemes 1174
gravity stamps 223
rolls in Germany 109
slime tables in the Harz mountains 728
Zollverein colliery, air blast at 837
mine, air blast at 839

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

RETURN TO ⟶ **CIRCULATION DEPARTMENT**
202 Main Library

LOAN PERIOD 1 **HOME USE**	2	3
4	5	6

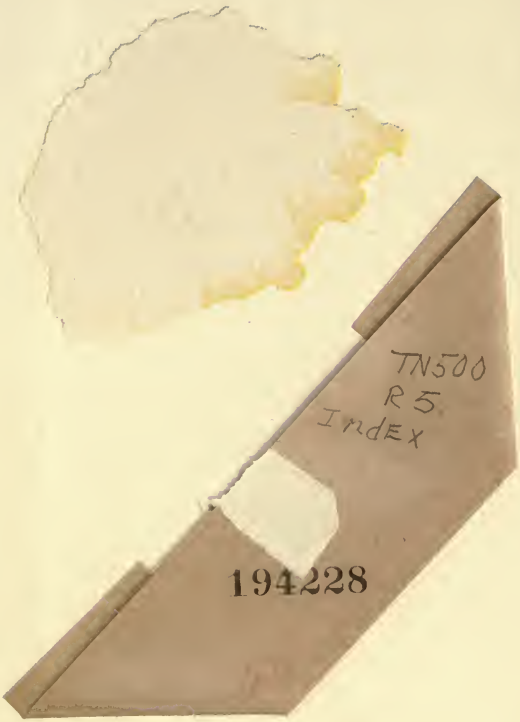
ALL BOOKS MAY BE RECALLED AFTER 7 DAYS

1-month loans may be renewed by calling 642-3405
1-year loans may be recharged by bringing the books to the Circulation Desk
Renewals and recharges may be made 4 days prior to due date

DUE AS STAMPED BELOW

AUG 28 1984		
REC CIR AUG 5 1984		

UNIVERSITY OF CALIFORNIA, BERKELEY
FORM NO. DD6, 60m, 1/83 BERKELEY, CA 94720

℗s

YC 68349